TECHNOLOGY DEPT

Gas Journal

VO . 283. 107th YEAR. LONDON, SEPTEMBER 14, 1955 Nº 4815. PRICE 1/3

ASCOT 715

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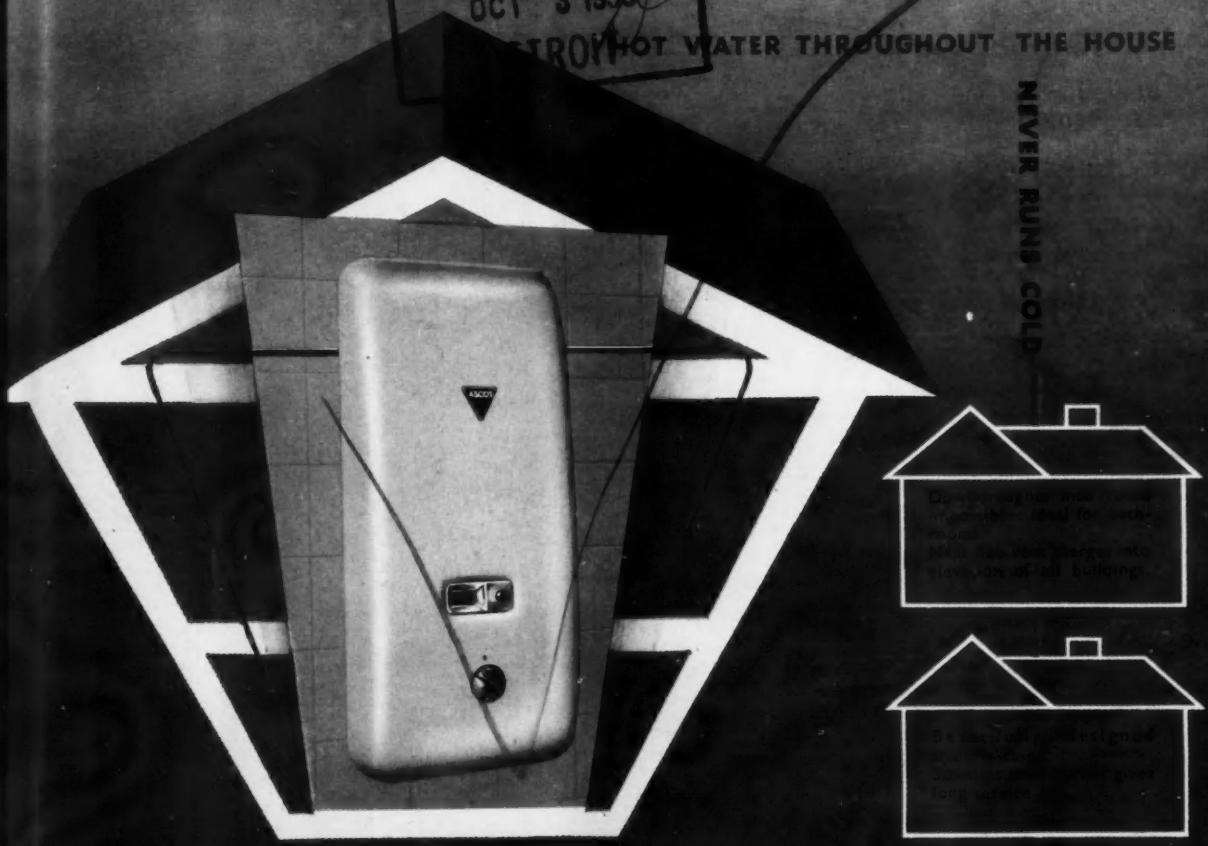

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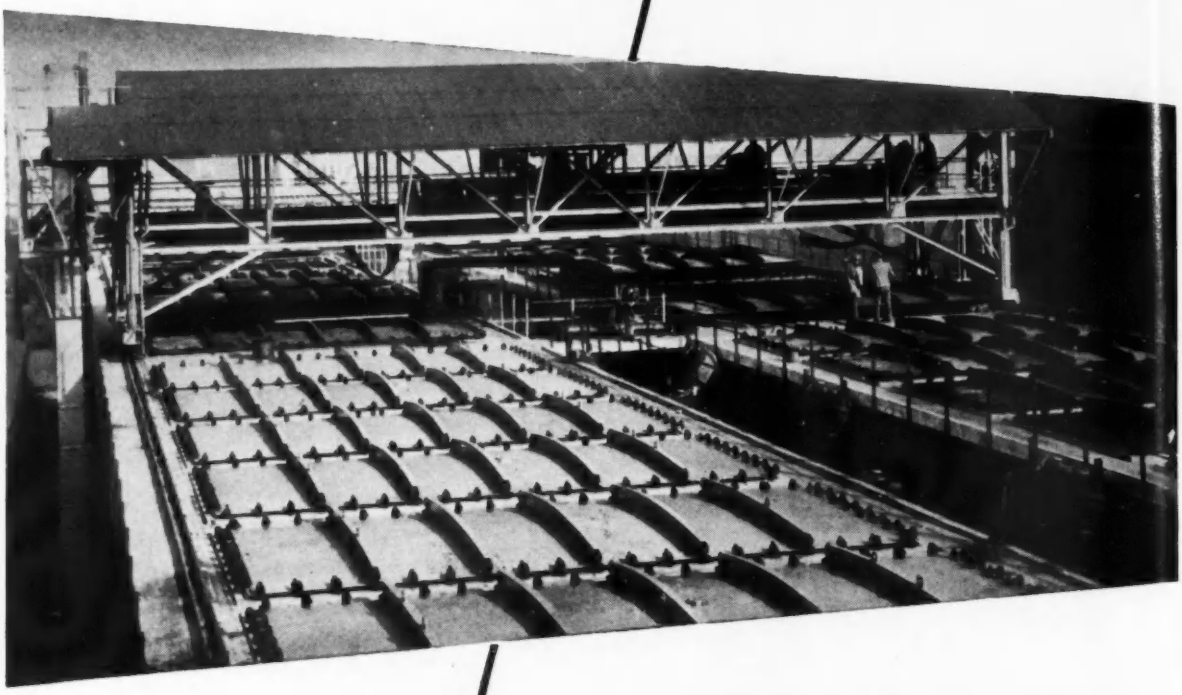

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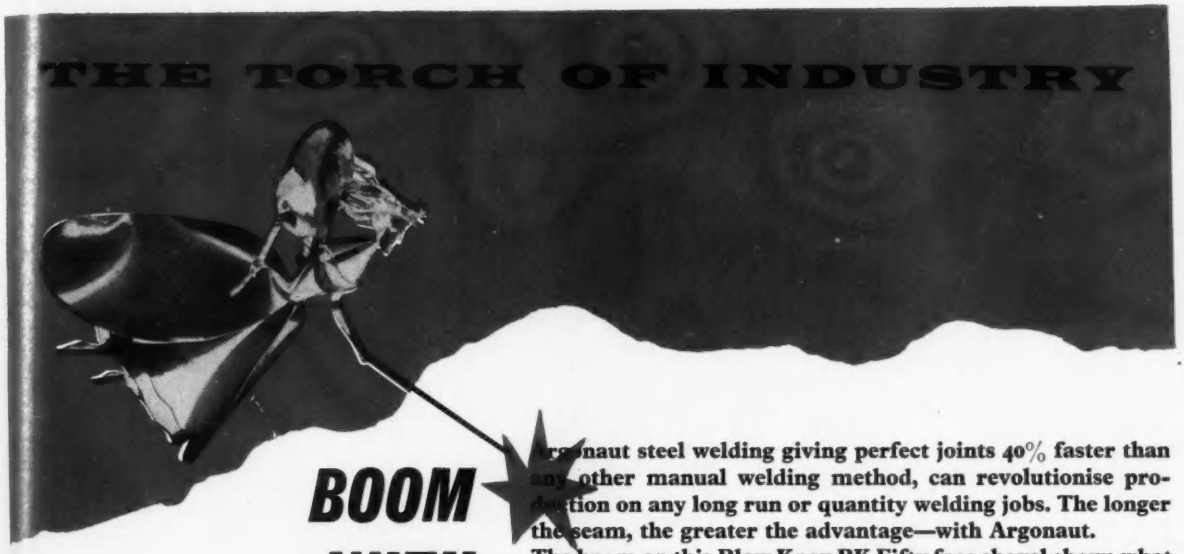

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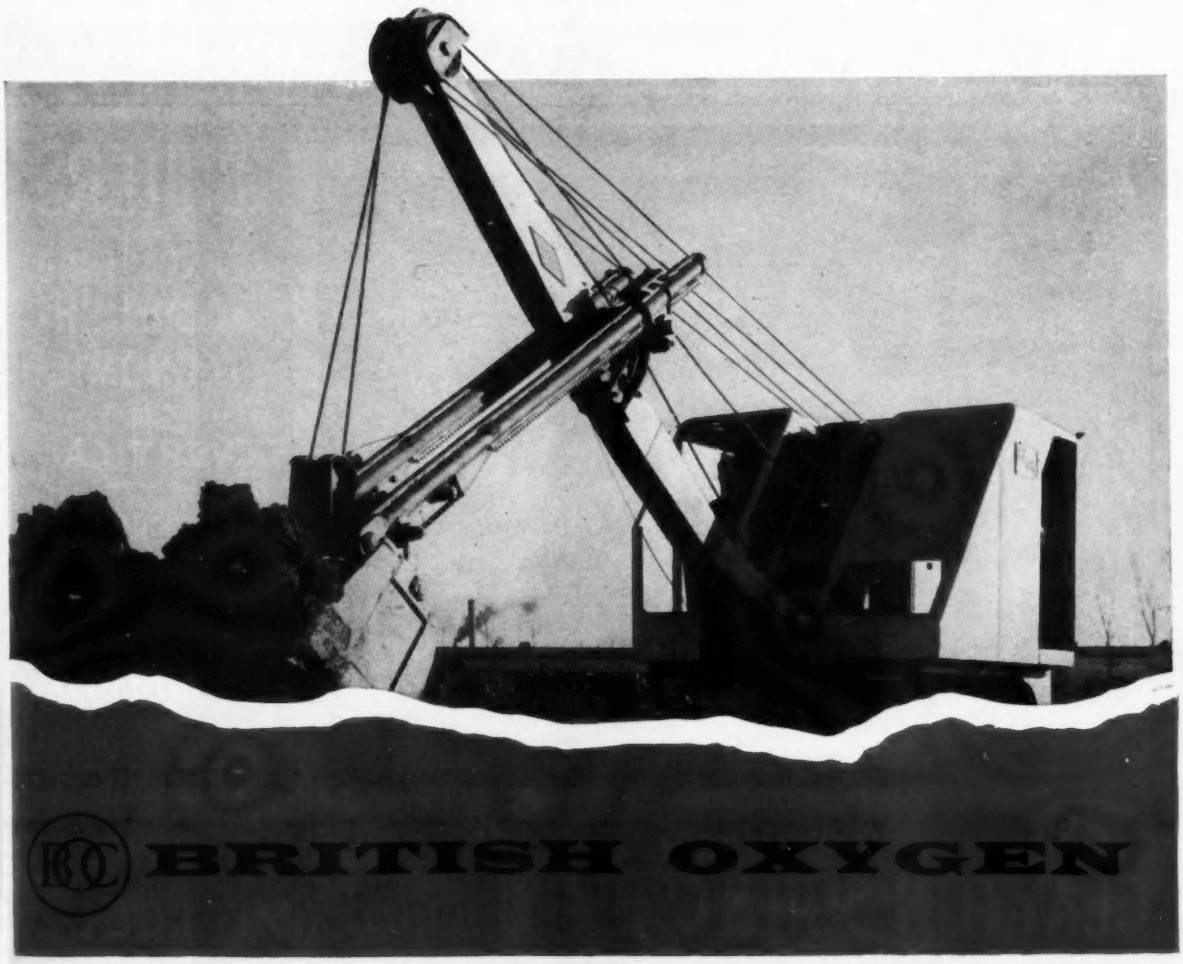

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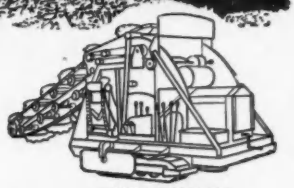

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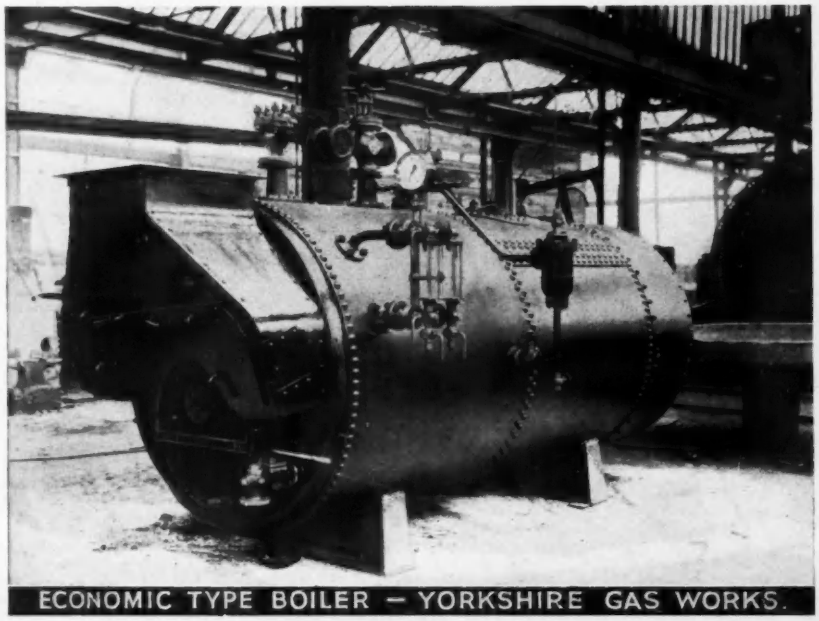

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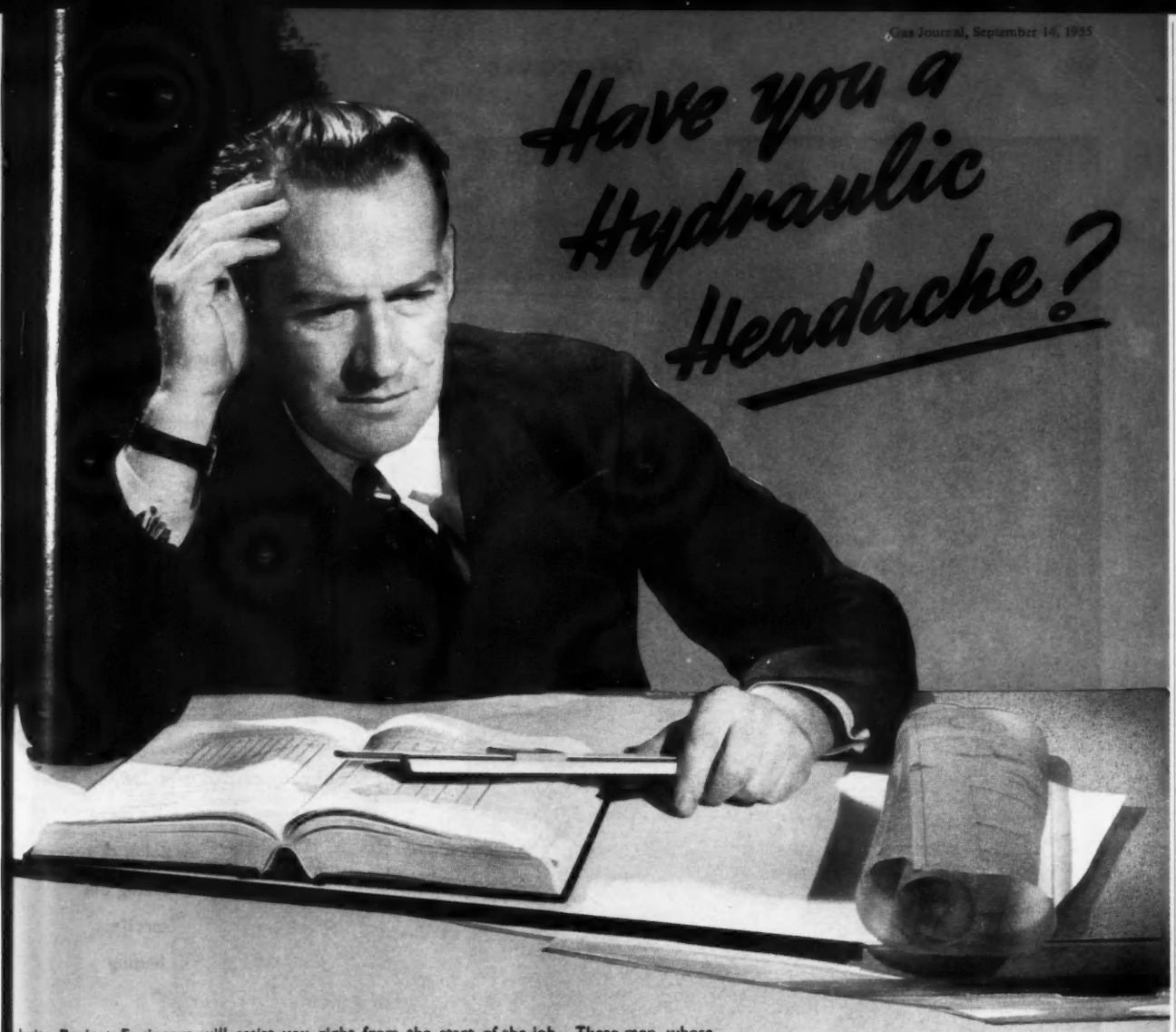

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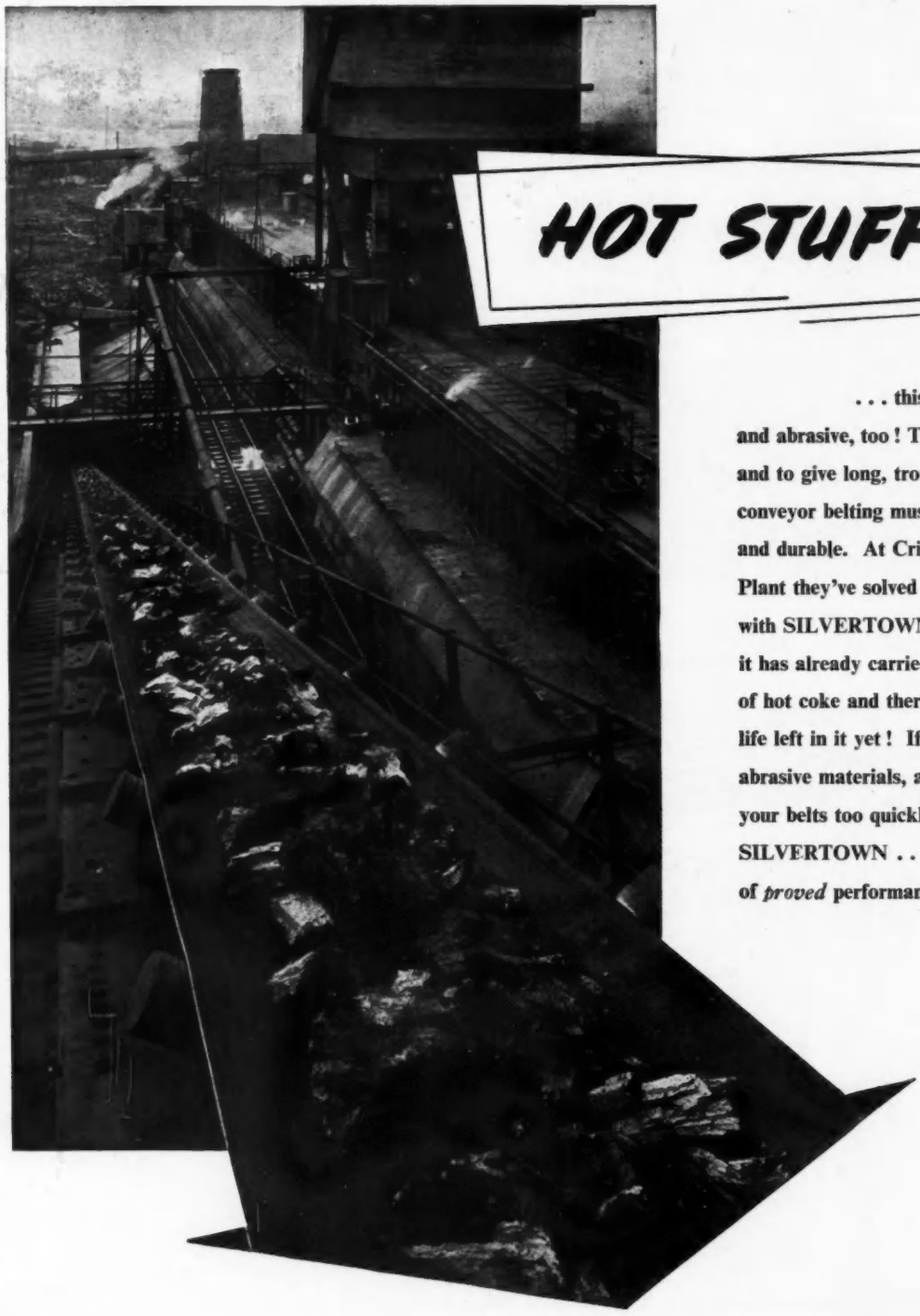

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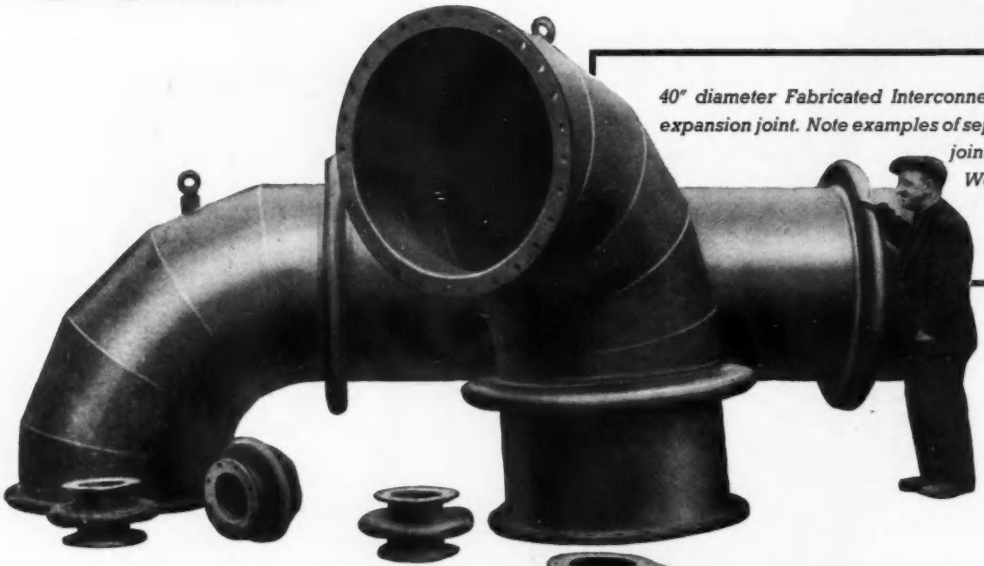

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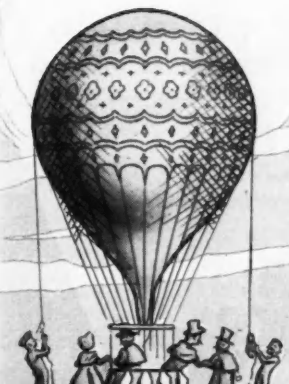

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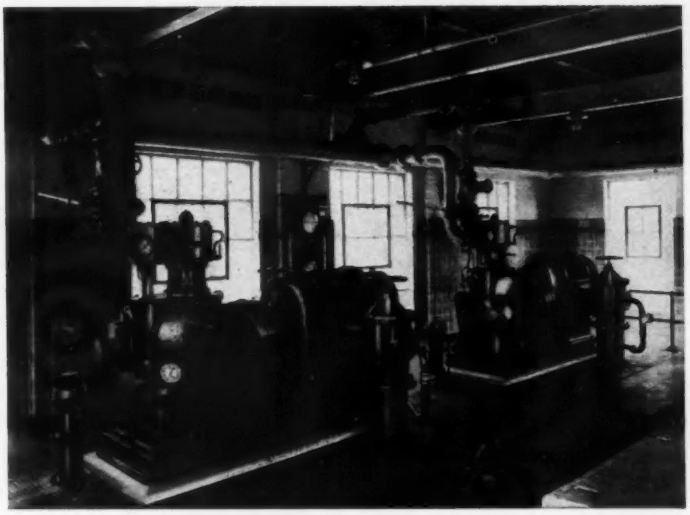

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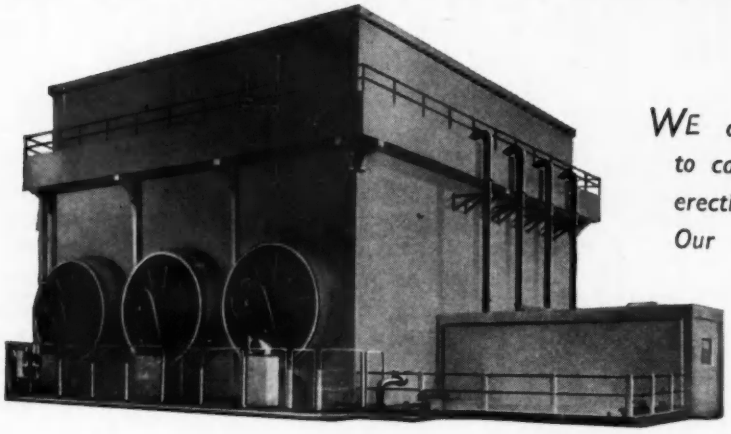

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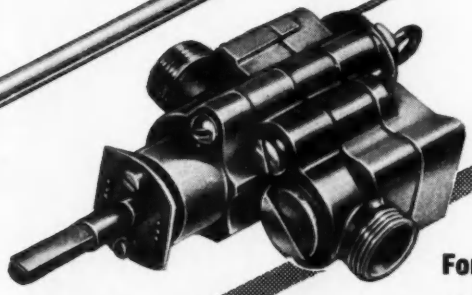

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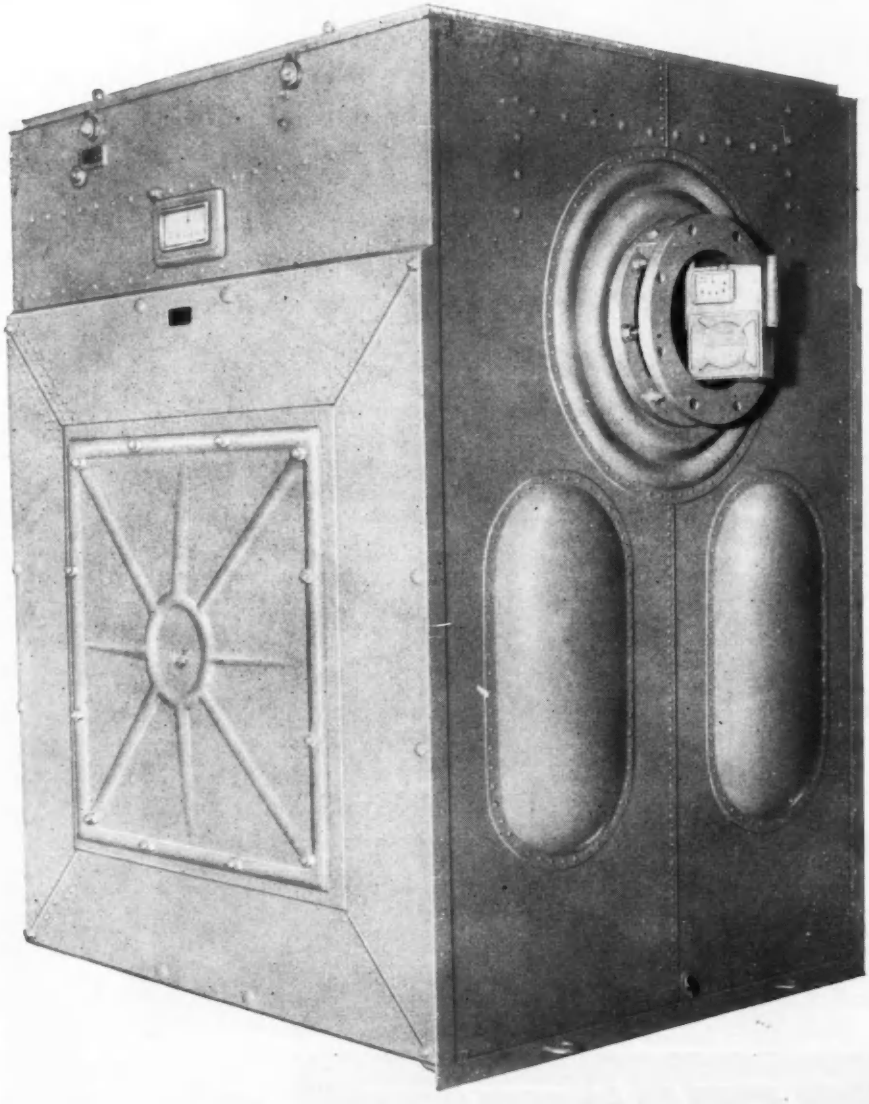
100 cu. ft. — 70,000 cu. ft. per hour

The measure of WILLEY service in meters



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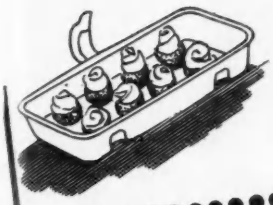
FOR BREAKFAST...

GRILLED LIVER

Cut the liver into slices ¼" thick. Brush with melted margarine, season to taste, and place in base of grill pan. Slice onion into rings, toss in flour, and saute in margarine around the liver 4—5 mins.

FOR LUNCH...

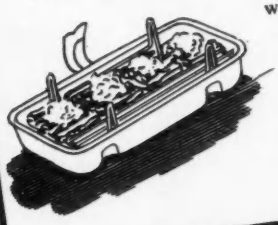
TOMATO CUPS with ROLLED FILLETS of PLAICE



Scoop out pulp from large tomatoes. Prepare and season fillets, sprinkle with lemon juice and roll, skin side innermost. Place in tomatoes with nuts of margarine on top. Brush tomatoes with margarine. Grill 10-15 mins. Garnish with parsley.

FOR SUPPER...

SARDINES with CREAM SAUCE



Melt margarine, add breadcrumbs and milk. Beat thoroughly. Add chopped hard-boiled eggs and seasoning. Keep warm till needed. Grill sardines gently. Serve on buttered toast, covered with the sauce.

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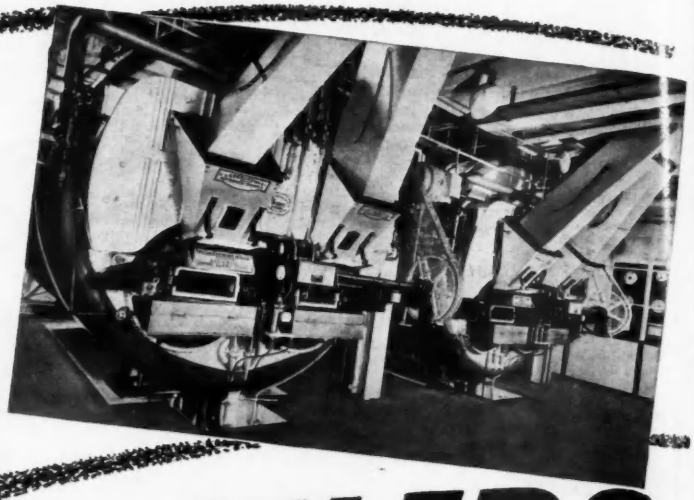

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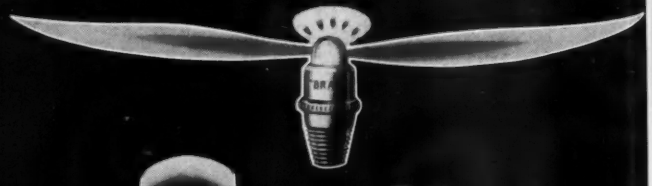

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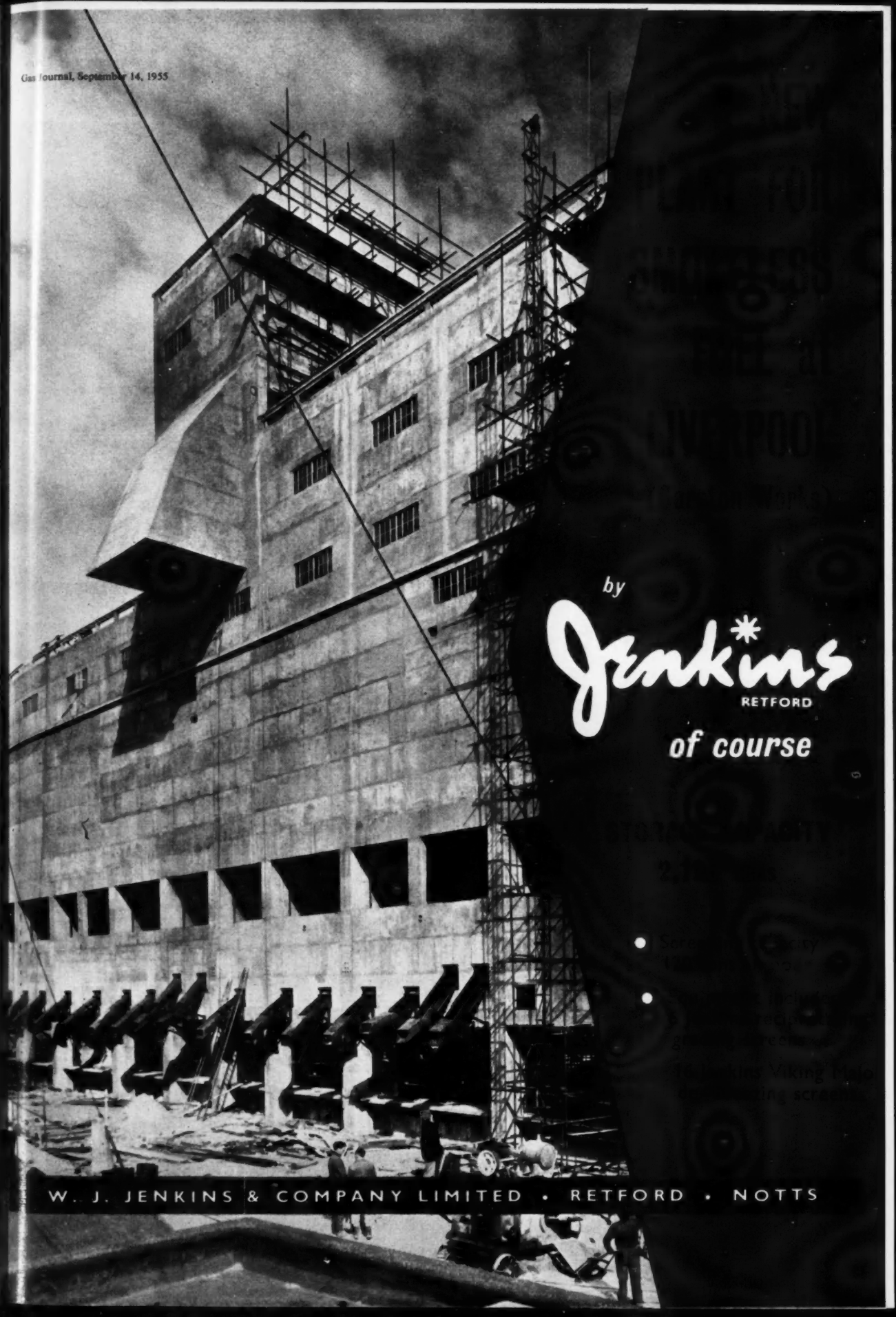

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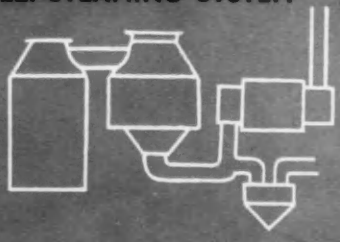

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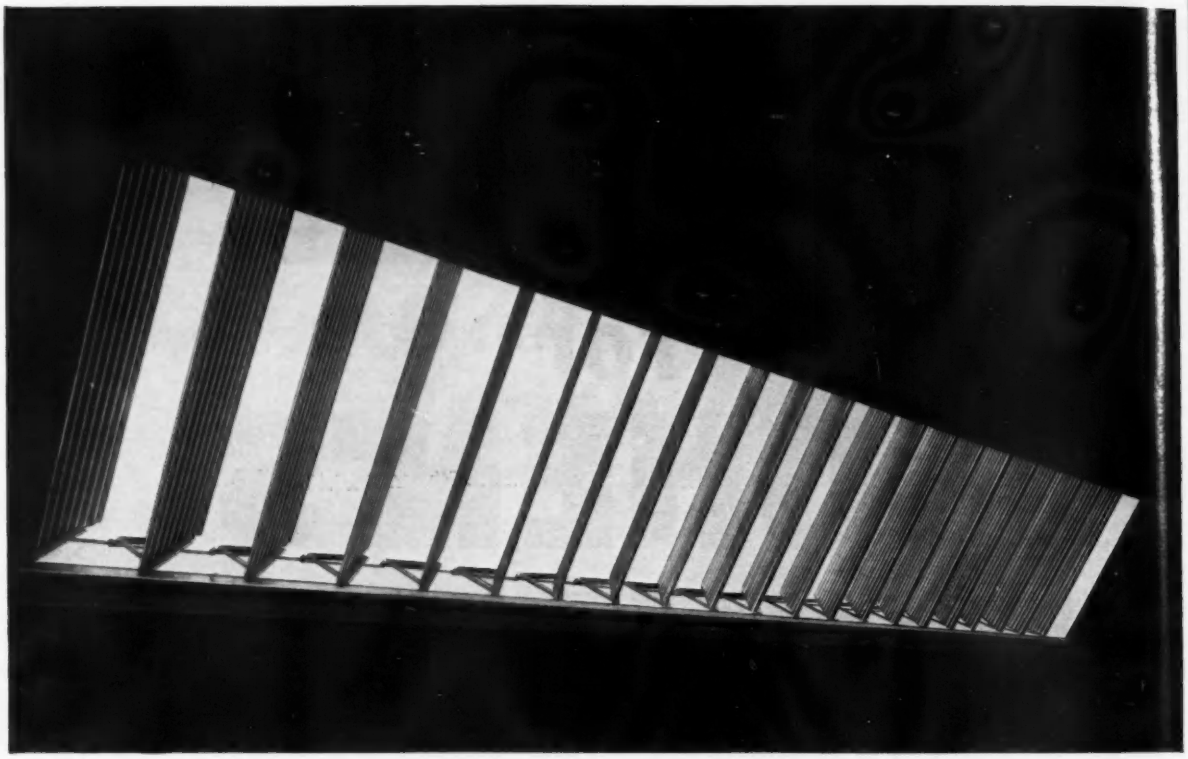

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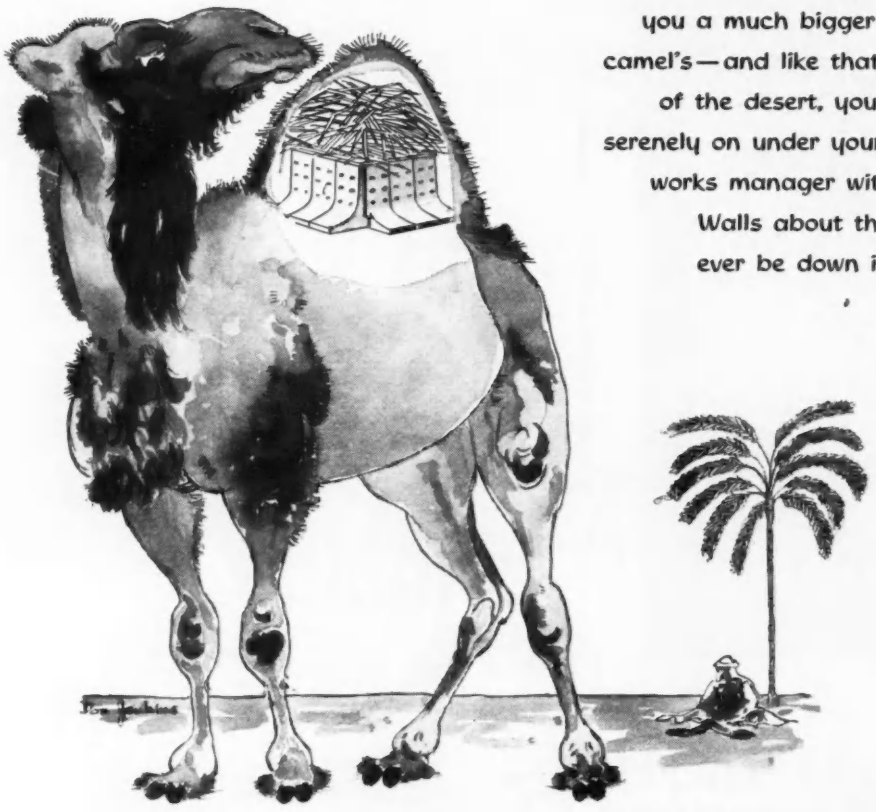

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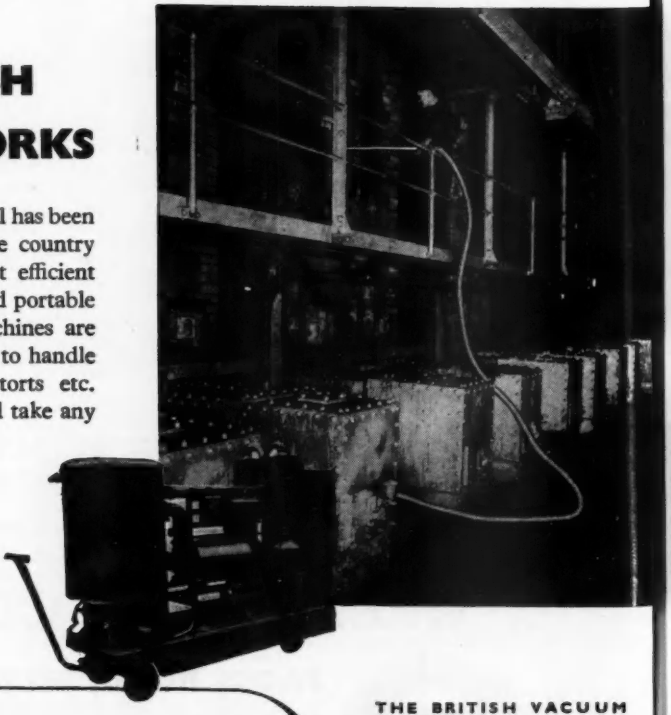

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GENERAL DESCALING M.C.E. exhibits patented Scale Removers used during campaign in Holland.*
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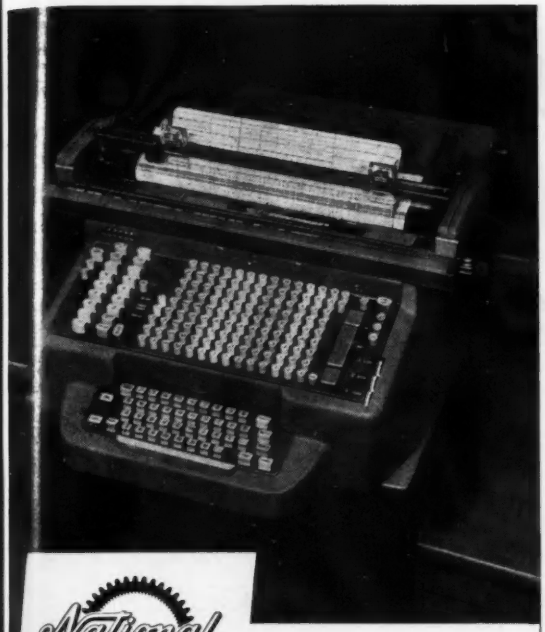

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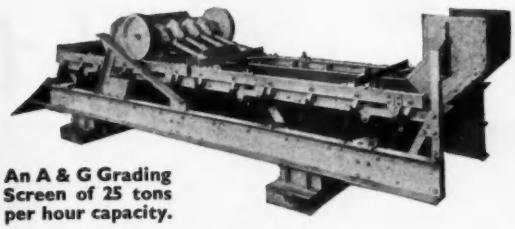

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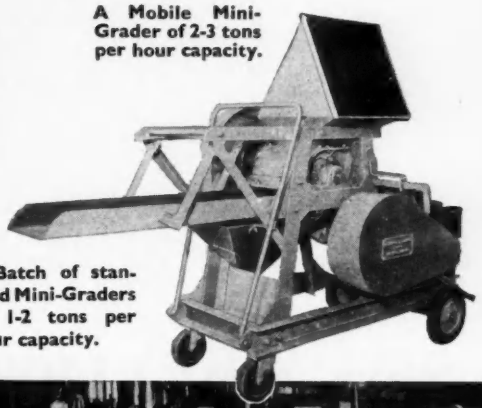

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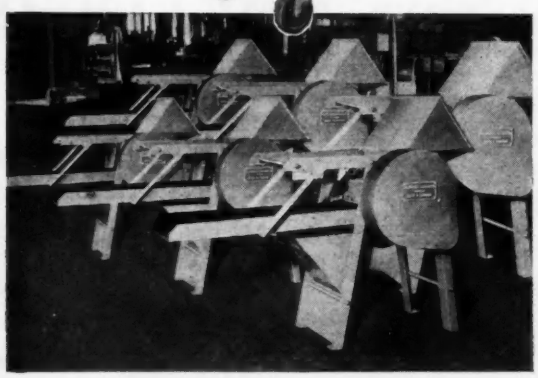

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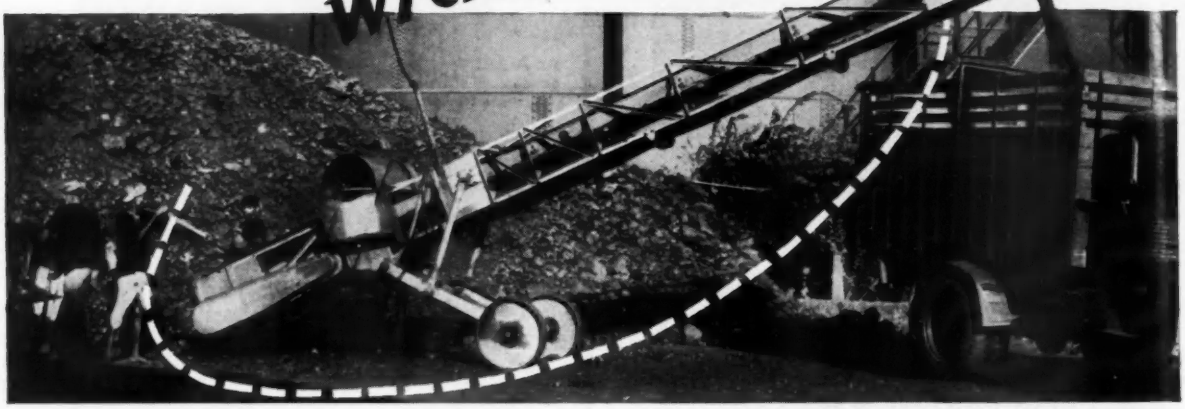

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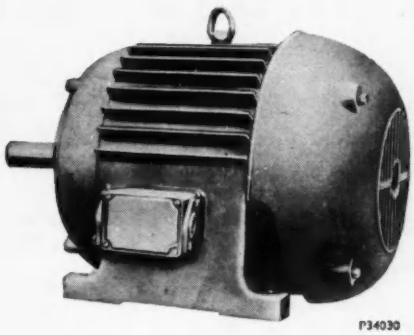

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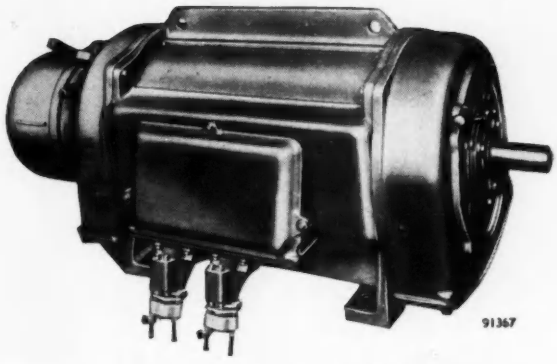

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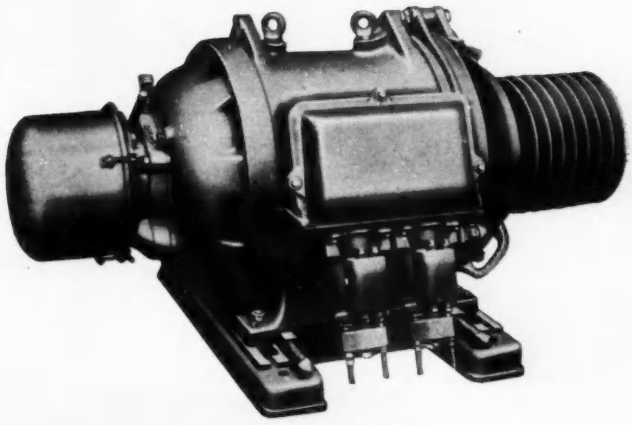

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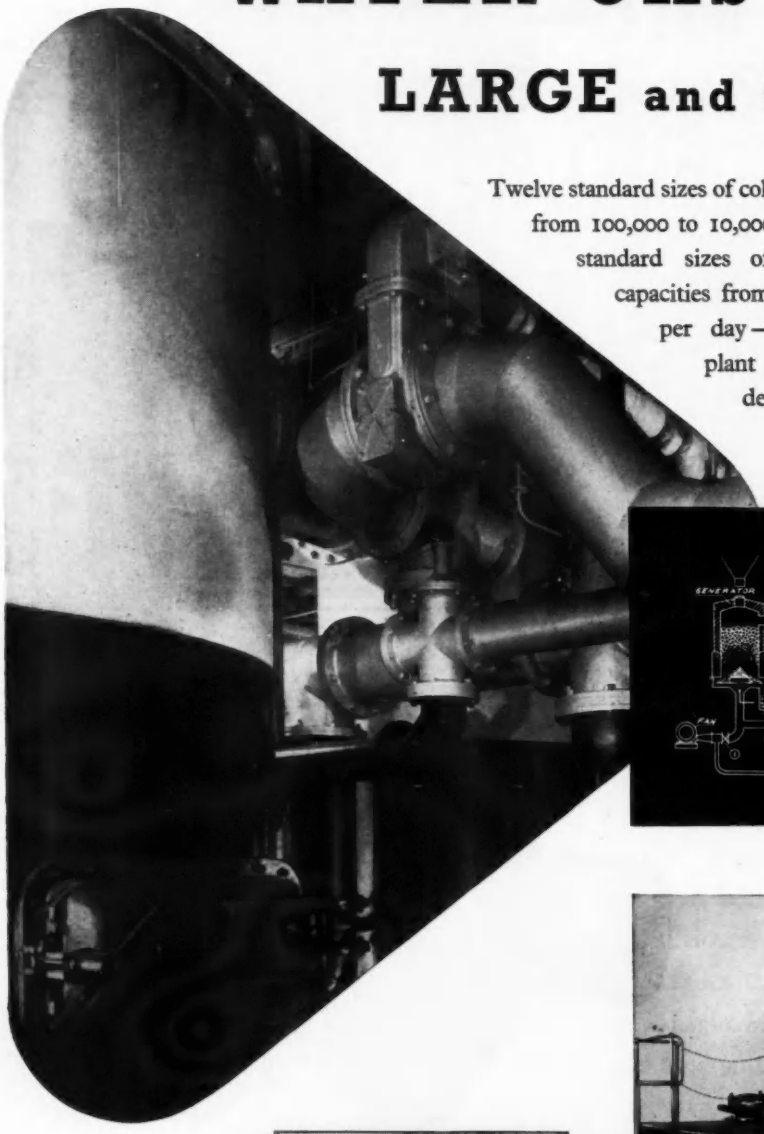

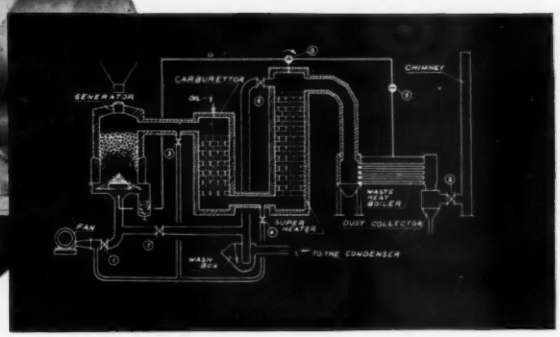

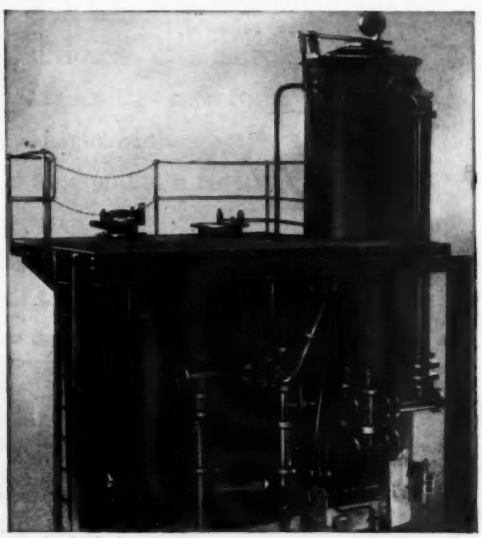

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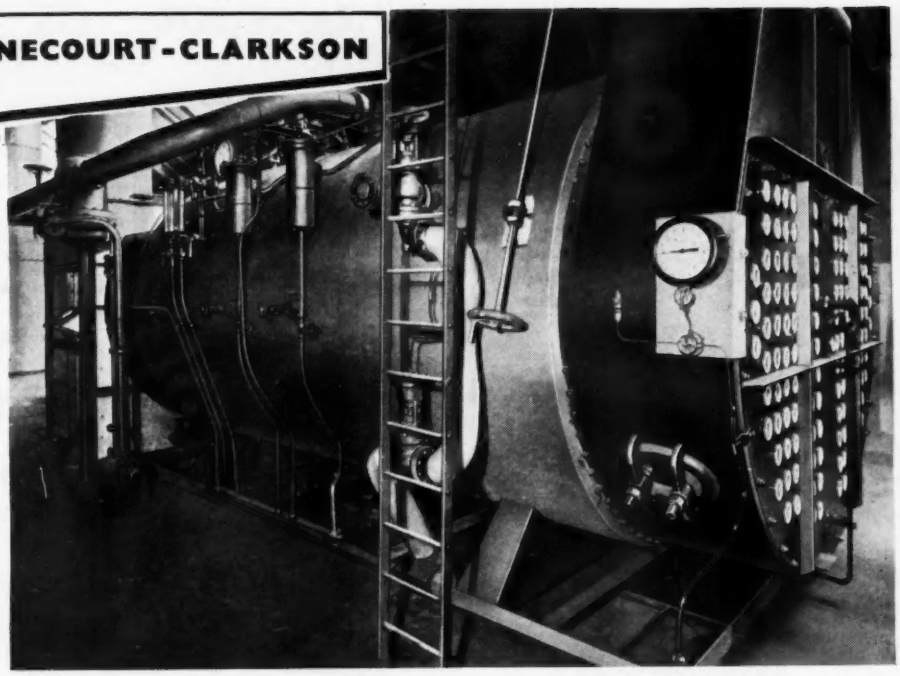

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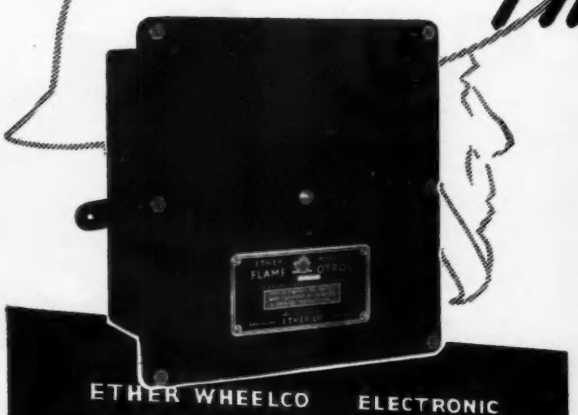

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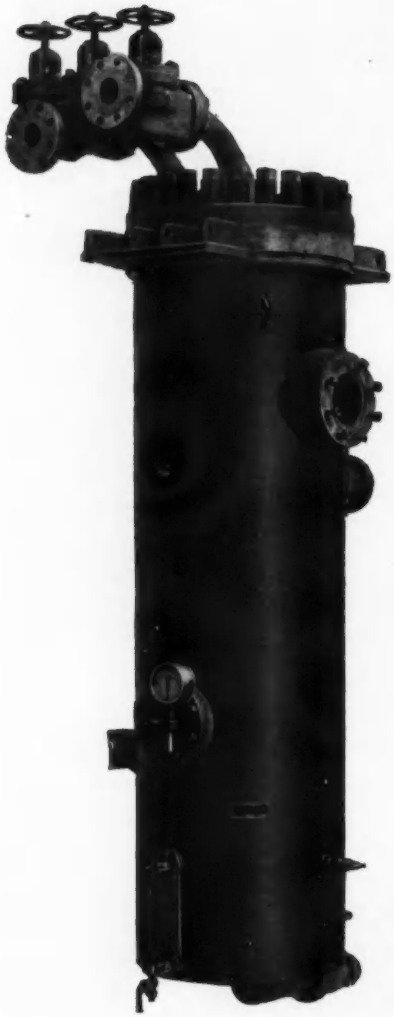

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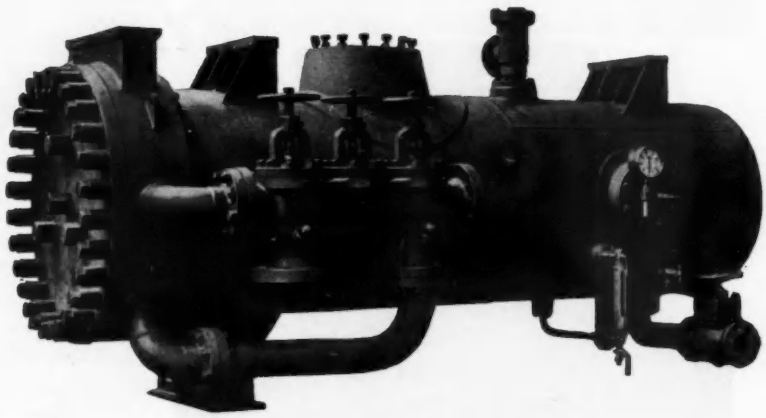

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WHESSOE

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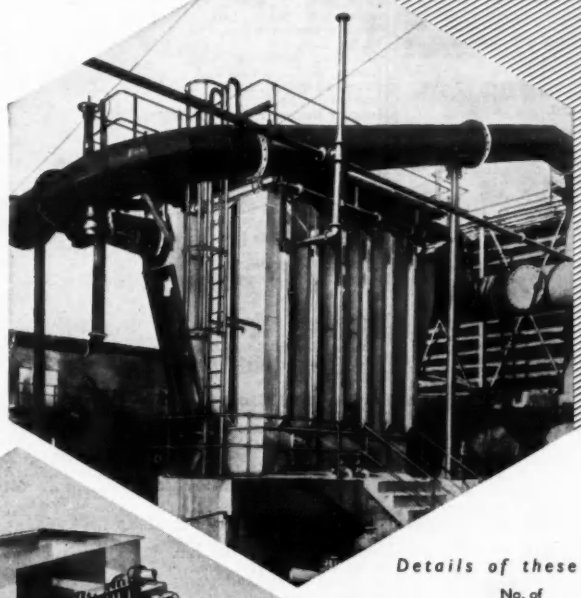
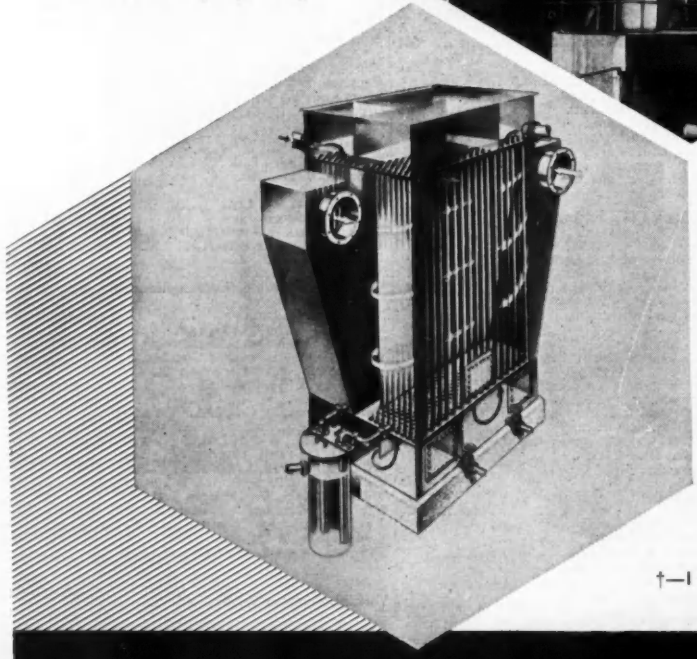
So far seventeen Whessoe cross-flow condensers — the latest and most efficient unit for gas cooling—have been ordered, eight of which are already in operation. The total capacity of these condensers will be over 65 million cubic feet of gas per day.





Details of these condensers are:

	No. of condensers	Total capacity of condensing plant
ABERAVON -	2 (s)	6½ mill. cu.ft. per day
BOLTON - -	2 (s)	8 mill. cu.ft. per day
CONSETT - -	2 (p)	16 mill. cu.ft. per day†
DEVONPORT	1	2½ mill. cu.ft. per day*
GILLINGHAM	2 (s)	3 mill. cu.ft. per day
LINACRE - -	2 (p)	8 mill. cu.ft. per day*
NEEPSEND -	2 (p)	10 mill. cu.ft. per day
PAISLEY - -	2 (p)	8 mill. cu.ft. per day*
REDDITCH -	2 (p)	3½ mill. cu.ft. per day*

s—series p—parallel *—operating
†—1 condenser operating. Remainder building or on order.

WHESSOE FOR GAS TREATMENT AND STORAGE

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W 58

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auto-matic burner ignition

for Gas or Oil

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Level Controls · Furnace Safeguards · Photo Timers · Switches

Gas Journal

VOL. 283 NO. 4815 September 14, 1955

107TH YEAR

MANAGING DIRECTOR: Clifford A. King

EDITOR: Trevor G. Williams, A.M.I.Mech.E., Assoc.Inst.Gas E., M.Inst.F.

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for any INDUSTRIAL REQUIREMENT

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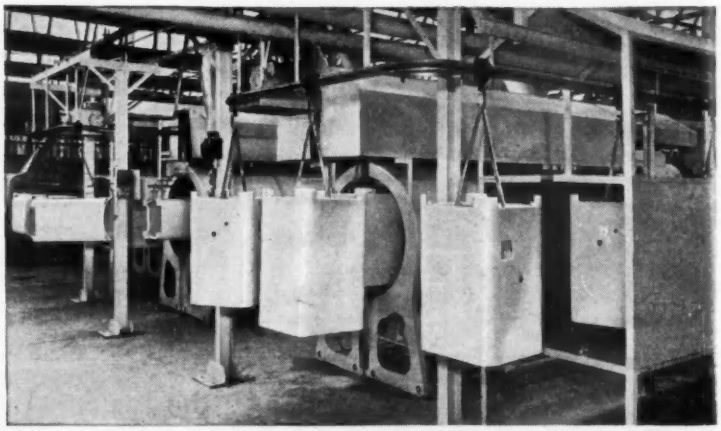
Put GAS INFRA-RED to work in *your* factory. We shall be glad to let you have full details.



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Gas Journal

VOLUME 283. No. 4815. SEPTEMBER 14, 1955. 107th YEAR

Liquid Methane for London?

IN our issue of November 3, 1954, we drew attention to the possibility of the British gas industry availing itself of the vast resources of natural gas which are to be found in other parts of the world, notably the Middle East. It will be remembered that a year or two ago an American, Williard Morrison initiated a scheme for the transportation of liquid natural gas from the Gulf Coast of America up the Mississippi and Illinois rivers by barge to Chicago and that from this stemmed the idea of conveying Middle East gas to Britain. Interest in this revolutionary project has been maintained although there has been no startling announcement as yet in this country. Just a year ago, a three-man team comprising, L. J. Clark, Development Engineer to the North Thames Gas Board, and two private industrial engineers visited the United States and had consultations with Mr. Morrison in Chicago and with Carl Flesher of the International Bank in Washington on this subject. From this we may conclude that at least one area board is taking the idea very seriously.

When one comes to think about it, it is hardly surprising that the London boards should be more interested than others in the enormous possibilities of such a scheme, since to obtain the maximum benefit from it, it is desirable that the liquid gas should be vaporized from the tanker straight into holder storage and mixed with diluting gases as soon as possible. For this purpose the large riverside works are ideal ports for unloading and, as everyone knows, the North Thames and South Eastern Boards have a considerable concentration of important manufacturing stations situated along both banks of the Thames, most of which could provide berths for sea-going tankers.

A recent statement by C. George Segeler, Utilization Engineer of the American Gas Association has considerable bearing on this matter. In his statement Mr. Segeler drew attention to the fact that the programme of barge construction for the Morrison project should still be regarded as experimental and that although the Ingalls Ship Building Company of Pascagoula, Mississippi has nearly completed the first experimental vessel, only two of the larger number of containers which it is designed to carry, will be installed. It also appears that the construction of these containers does not meet with the requirements of the U.S. Coast Guard and that, as a result, the barge, when completed, could not be moved in U.S. navigable waters except in an empty condition.

It is the opinion of the Coast Guard, however, that if the construction was changed to include the use of a type of steel which would be acceptable from the point of view of exposure to extreme low temperatures, then their approval for the use of the barge could be requested. Whether this would be granted, however, would then depend upon the completion of the several normal and official steps needed when a change in Coast Guard regulations is to be made. At this time there is no indication that the barge design is to be changed to conform to this plan aimed at securing approval. The construction of the containers on the barge will be as previously described, namely an inside 12 in. lining of balsa wood, joints being made by special plastic cements.

The reason for the Coast Guard's embargo lies in their dissatisfaction with the balsa wood and steel construction which has been used for the containers. The designers feel that this balsa wood structure will be completely liquid proof and that there is not the slightest danger of liquid contact with the plain carbon steels used for the container exterior. The Coast Guard, on the other hand, think that the possible affect of collision with either vessels or with projecting structures would make such a design inadequate.

If the American authorities cannot see their way to approving the Morrison tanker for coast-wise traffic in home waters it would suggest that that particular method of construction would not be suitable for the long sea journeys involved in conveying liquid natural gas to this country from the Middle East. The problem may, however, be solved by the use of a special steel for the containers as recommended by the U.S. Coast Guard or, possibly, by the use of some other material such as aluminium. Clearly the cost of constructing suitable ships for bringing liquid natural gas to Britain would be considerable; on the other hand the dividends to be reaped by the gas industry could be equally substantial. In this case it is not a matter of searching for natural gas—the gas is to be had provided it can be liquefied and transported to the point of use. In these days when the British gas industry has to consider all manner of expedients to overcome the shortage and high cost of home-produced coal, this proposition is one that recommends itself as worthy of careful consideration. Possibly the next piece of news on the subject will come from our side of the Atlantic.

The Ten-therm Block

WHEN, on August 5, the East Midlands Gas Consultative Council agreed to a new two-block tariff, there was sparked off some considerable comment both in the gas industry and the national Press. The tariff establishes a two-block charge for all domestic consumers, the first block being of 10 therms a quarter. Prices differ slightly in the four zones within the Area but on average the cost of the first block is 26.6 pence (2s. 2½d.) per therm and all subsequent therms are priced at 14.7 pence (1s. 2½d.).

The first criticism of the new arrangement was inevitably a defence of the old age pensioners. 'Surely', it was argued, 'the old age pensioners are the ones who should be given the cheaper rates? They cannot afford to buy as much as 10 therms a quarter, so isn't it rather silly to encourage them to buy more by giving them a high rate for less, and a cheap rate for more than 10 therms?' But Mr. Sydney Smith, Chairman of the East Midlands Gas Board, was quick to correct this 'widely held misconception.' 'The very small consumer', he said, 'is by no means always the old age pensioner. In fact the great majority of pensioners fall into the average consumer group (using about 30 therms a quarter) and many could thus benefit from the new tariff'. We hope that he is right.

Now, in an article in *Link-up*, the magazine of the North Western Gas Board, George Polanyi, the Board Statistician, analyzes what he calls a 'Revolutionary Gas Tariff.' He explains most lucidly why, although therms all look alike and each has roughly the same chemical composition and the same burning properties as any other, 'there are cost differences between one therm and the next which are just as important as the difference between a Rolls Royce and an Austin 7'. And, as we all know, the answer lies in the installation and maintenance of equipment, including mains and service pipes, the cost of which must be borne by everybody who uses gas, including the small consumers. Once all that has been paid for by a high-priced first block then the rest of the gas can be sold at a rate which simply covers the cost of the gas. The result is a second block at roughly half the price of the first, and an incentive to the consumer to buy more gas.

It is interesting to compare the prices of gas with those of electricity, together with the block-systems of each. Some of the electricity boards have, as yet, not standardized their rates. Others which have done so still seem to present a confusing picture. In fact, for all the criticism of gas, the rates which are applied for it are much simpler for the general consumer to grasp than those of electricity. It is easier then to apply the comparison to only one board and in this case it is appropriate to select the East Midlands Electricity Board. Appropriate, not only because we have been discussing its opposite number in the gas field, but also because the Board has announced new tariffs which will come into effect on October 1. For domestic consumers the rate will be 5d. per kWh for the first block of 36 for the first three rooms and 11 for each additional room. The average first block is then about 70 kWh. The follow-on rate is 1d. per kWh.

The first point to notice is that the block tariff ratio is 5 to 1, as compared to 2 to 1 for gas, but the first block is only a quarter as large as that for gas. Second, the rate is equivalent to about 12s. 3d. a therm for 2½ therms reducing, thereafter, to 2s. 5½d. a therm. It becomes evident, therefore, that the gas industry has a cheaper product to offer for domestic use provided a basic minimum of consumption is exceeded. The new tariff, in reflecting this fact, will surely boost gas sales to domestic consumers very considerably in the East Midlands Area.

A 'Spot' for the Industry

'SPOT' is a word (hereinafter not in quotes) that we might soon be uttering as regularly as the publicists now talk of 'space.' We shall have a better idea of the word's prospects after October 1. On that day, between 9 and 9.30 p.m., the South Eastern and North Thames Gas Boards take the first gas industry plunge into the unknown depths of commercial television. Fifty-eight seconds, that is all, fifty-eight seconds during which a pleasant-faced young actress will talk about and demonstrate the new Radiation gas and coke fire. Lots of work has been put in on examining the possibilities. But the truth is that anything could happen, from a few half-hearted enquiries, to a demand for this particular appliance that could cause a sweet headache for every showroom in the areas concerned—not to mention the manufacturers.

These two boards have booked seven spots in all which are 'in the nature of an experiment to test the power of T.V. advertising.' We genuinely feel admiration for their courage. Independent of the Gas Council or of anyone else they have put themselves out on a limb, acting with the progressive outlook of any large private-enterprise industry. They can expect attacks from two classes of critic. First there will be the brickbats from those who think of nationalisation as putting an industry beyond the scope of enterprise; who think that all publicity by the gas and electricity industries is negative. Second there will be a number of people who feel that we should wait for an assessment of commercial television's value.

To both arguments we would reply that until there is a national fuel policy there will be competition—and while there is competition the best man wins. No legitimate holds are barred. Where new advertising ventures are concerned they must be tried if they have any possibility of stimulating demand to a worthwhile extent. Who knows? Perhaps this one little spot may mean that hundreds or even thousands of coal grates will no longer add their dirty little contributions to the inevitable smogs of the coming winter. Another wedge might be driven into that problem, and at the same time the two most economical forms of heating are being given the benefit of the doubt of the strength of this new medium.

The South Eastern and North Thames Gas Boards have done well and if they are successful they will soon feel the weight of garlands hung about their necks; if they are not immediately so blessed it would be advisable to wait awhile before hurling bad fruit. We wish them every good fortune—and hope dearly to see the manufacturers soon following their example with their own spots. We feel quite sure they will be looking in on October 1, between 9 and 9.30 p.m.

6th International Gas Conference

As this issue of the 'JOURNAL' reaches its home subscribers R.M.S. 'Caronia" will be preparing to sail from Southampton to New York, carrying among her first class passengers the majority of the British Delegation to the 6th International Gas Conference. The International Gas Union is comprised of representatives of the national gas associations of 17 countries; and it will be remembered that the earlier post-war conferences were in London in 1949, under the Presidency of the late Colonel C. M. Croft, and in Brussels in 1952, under Monsieur M. Brabant.

The President, who is just about to complete his term of office is the genial Robert W. Hendee, whom many of us had the pleasure of welcoming at the recent Institution Meeting in Southsea. A distinguished Committee of United States gas executives has been responsible for the arrangements on the other side; among names well known here, through their earlier visits, being Alexander Forward, former Managing Director of the A.G.A., and Clifford E. Paige, former President of The Brooklyn Union Gas Company.

Conference Programme

The Hotel New Yorker has been reserved for the conference, which will open informally on Sunday, September 25, with a reception for the delegates. Monday's programme includes a boat trip around Manhattan Island, a meeting of the International Gas Union Council, and a dinner for Council Members. On Tuesday formal greetings will be extended to delegates from officials, including F. M. Banks, President, A.G.A., and R. H. Touwaide, Brussels, General Secretary of the Union, and separate meetings will be devoted to transmission and distribution and to gas production. There will be a reception in the evening.

Utilization and gas production will be topics for sessions on Wednesday, with a luncheon sponsored by Consolidated Edison Company. A visit to The Brooklyn Union Gas Company, and a formal banquet and entertainment, also are included in Wednesday's programme. Thursday's session will be devoted to educational subjects and reports on requirements for international standards for gas appliances and on gas conditioning. Thursday afternoon will be given over to a visit to United Nations. On Friday a field trip to the Harrison (New Jersey) plant of the Public Service Electric and Gas Company is scheduled.

National reports and individual papers are contributed. British reports deal with disposal of effluents and with education and training; individual papers are on pretreatment of coal, by Dr. Parker, the operation of oxide purifiers, by Dr. Moignard, and on the life of refractories, by Dr. Haffner.

A comprehensive list of tours is offered to the delegates. They promise to be exceedingly strenuous but full of interest and variety. A moderate stringency in dollar allocations is likely to restrict our party to the more modest itineraries. These are Topton, Philadelphia, Washington, before the conference proper; and Niagara, Cleveland, Chicago, Pittsburg, after the conference—namely, from October 1 to 8.

British Delegation

Of the following forty who comprise the British party, all but three are travelling in the 'Caronia.' Six wives will be carried on the strength.

Andrew, L. W., Director, Watson House.
Badger, E. H. M., Research Chemist, N.T.G.B.
Bardgett, H., Principal Scientific Officer, Fuel Research Station.
Battersby, T. C., D.G.M., Watford, E.G.B.
Bennett, A. R., Research Manager, Radiation, Ltd.
Boden, W., Technical Manager, Stanton Ironworks.
Braunholtz, Dr. W. T. K., Secretary, I.G.E.
Burns, D. D., Deputy Chairman, Sc.G.B.
Carr, James, Deputy Chairman, S.W.G.B.
Cheetham, H. S., Director, Woodall-Duckham Construction Company, Ltd.
Croft, C. R. M., D.G.M., Sussex, S.E.G.B.
Crowle, L. S., Distribution Engineer, Manchester, N.W.G.B.
Currier, G. E., Deputy Chairman, N.E.G.B.
Davis, J. E., Chief Technical Officer, S.E.G.B.
Edwards, Dr. R. S., Chairman, N.E.G.B.
Francis, Owen, Ministry of Fuel and Power.
Francombe, K. W., Senior Technical Engineer, Whessoe, Ltd.
Garrett, W. R., Constructional Engineer, N.G.B.
Gibson, T. W., Engineer, Metropolitan Division, S.E.G.B.
Haffner, Dr. A. E., Station Engineer, Fulham, N.T.G.B.
Hart, H. R., Commercial Manager, E.M.G.B.
Hartill, I. J., Technical Assistant (Production), N.W.G.B.
Howell, W. F. S., Manchester Sales and Service, N.W.G.B.
Hutchison, W. K., President, I.G.E., and Chairman, S.E.G.B.
King, C. A., Managing Director, 'GAS JOURNAL.'
Moignard, Dr. L. A., Senior Chemist, Birmingham Research Station.
Oatley, A. F., Chairman, Cannon (G.A.), Ltd.
Pearson, C. H., Director and General Manager, Parkinson and Cowan, Ltd.
Pyper, F. G., Chief Engineer, E.M.G.B.
Shann, C. D., Manager, Gas Engineering, D. & C. and William Press, Ltd.
Silcox, A. H., Editor, '*Gas World*.'
Simpson, T. W. B., Constructional and Maintenance Engineer, N.W.G.B.
Smith, Sir Harold, Chairman, The Gas Council.
Smith, J. F., Production Engineer, Fylde, N.W.G.B.
Smith, Sydney, Chairman, E.M.G.B.
Snelling, R. S., Deputy Chairman, Wales G.B.
Taylor, H. B., D.G.M., Leicester and Northants, E.M.G.B.
Thorne, W. F., Technical Officer, S.G.B.
West, John F., Managing Director, West's Gas Improvement Co., Ltd.
Wright, S. L., Gas Engineer, Wales G.B.

Analysis shows that apart from the President and the Secretary of the Institution, Sir Harold Smith, and Mr. Owen Francis, the delegation includes three Research Specialists, five members of the N.W.G.B., four of the E.M.G.B., three of the S.E.G.B., two each from N.E., N.T., and Wales, and one each from Eastern, Northern, South Western, Southern, and Scottish. Eight of our most important manufacturing firms are represented and two Technical Journals of age and high repute.

INCREASE IN SUBSCRIPTION RATES AND SINGLE COPY PRICE.

We regret that continuing heavy rises in production costs and overheads compel us to increase our subscription rates as from October 1, 1955. The new annual advance subscription will be:—Home and Empire 60s.; Foreign 70s. The price of single copies will be 1s. 6d. (by post 1s. 8d.) as from that date.

The new rates will apply to existing subscribers when their current subscription expires.

Personal Notes

MR. JOHN URE, Kirkintilloch gasworks foreman, has been presented with a gold wrist watch by the Scottish Gas Board in recognition of long service.

MR. W. F. SHERWIN, of Meads Road, Uxbridge, received a canteen of cutlery from his colleagues at the North Thames Gas Board, Slough, on the occasion of his marriage to Miss C. A. Rhodes, of Hunertcombe Lane, Burnham.

MR. THOMAS MACKIE, gas manager at Keith for 26 years, has retired. He was presented by the staff with a gold watch and a lemonade set. Mr. Mackie started his gas career in his native Tayport and served at Stranraer and Kelty before his appointment at Keith.

MR. T. SCOTT RICKETTS, at present a Headquarters Chief Officer of the Wales Gas Board, has been appointed Chief Engineer to the Scottish Gas Board. He was educated at Hertford Grammar School and began his career in the gas industry with the former Tottenham and District Gas Company. In 1949 he was appointed Engineer responsible for production and distribution for the Hitchin District of the Eastern Gas Board. In 1950 he was appointed to the Wales Gas Board Headquarters Staff as Assistant Distribution Engineer, subsequently becoming Manager of the Eastern Gas Grid in 1951. In 1952 he was appointed Manager of the South Wales Gas Grid, incorporating both Eastern and Western Sections, with responsibility to the Board for the operation, management and administration of the grid and for certain important constructional work, including the construction of the new Aberavon Gasworks of 30 mill. cu.ft. per day capacity. Throughout his service with the Wales Gas Board he has been intimately concerned in the planning and construction of the South Wales Grid, which is at present serving 38 undertakings and supplying more than 75% of all the gas sold in Wales. Mr. Ricketts holds the Institution of Gas Engineers' Diploma in Gas Engineering (Manufacture) with Distinction, and also the Diploma in Gas Engineering (Supply). He has been awarded the Charles Hunt Medal, the Milbourne Medal and the Society of British Gas Industries' Medal.

Obituary

MR. JAMES SCRIVENER, a former managing director and vice-chairman of Electrolux, Ltd, has died at the age of 74. Mr. Scrivener, who was connected with the Company since 1919, retired from the Board of the Company in 1952 and has been living in retirement at Felpham. Early last year he was made a Knight of the Royal Order of Vasa (First Class), a high Swedish decoration, for his work in furthering Anglo-Swedish trade relations.

Diary

September 13-16. — ASSOCIATION OF PUBLIC LIGHTING ENGINEERS: Annual Conference, Folkestone.

September 19. — NORTH EASTERN G.C.C.: Bridge Street, Leeds 2. 2.45 p.m.

September 19. — WEST MIDLANDS G.C.C.: Committee Room, Gas Offices, Edmund Street, Birmingham 3. 2.30 p.m.

September 19-20.—EASTERN SECTION, I.G.E.: Annual General Meeting, Chairman's Address, W. A. Evetts; 'Some Problems involved in the Manufacture and Distribution of Gas,' B. Wilkinson; Grand Hotel, Sheringham.

September 21.—MANCHESTER JUNIORS: Visit to K.L. Cranes, Ltd., Letchworth.

September 22. — STANTON IRONWORKS CO., LTD.: Mr. Geoffrey Lloyd, Minister of Fuel and Power, opens coke oven extensions.

September 22.—SCOTTISH ASSOCIATION OF GAS MANAGERS: Annual General Meeting, Town Hall, Inverness.

September 24.—EASTERN JUNIORS: Presidential Meeting, Norwich.

September 28.—IRISH GAS ASSOCIATION: Annual Meeting; Presidential Address, S. L. Doyle (Cork); 'Gas Distribution,' A. L. Allen and J. J. Mahoney; Imperial Hotel, Cork, 10.30 a.m.; afternoon outing to Blarney Castle; annual dinner, Imperial Hotel, 7.30 p.m.

September 29.—NORTH THAMES G.C.C.: Westminster City Hall, 2.30 p.m.

October 4.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, S.W.1, 11 a.m.

October 5.—MIDLAND JUNIORS: Report on the Paris visit. Birmingham.

October 6.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Annual Meeting, South Wales Institute of Engineers, Cardiff; official luncheon, Park Hotel; visit to Nantgarw Coke Ovens.

October 14.—MIDLAND SECTION, I.G.E.: Autumn Meeting, Palace Hotel, Buxton. 11.0 a.m. Paper by H. Oliver and K. Carr: 'Some Observations on Refractories for Gas Retorts.'

October 19.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting. Address by Chairman, W. B. Claridge.

October 25.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, W.C.2, 11 a.m.

Firm's Fuel Bill Reduced

As part of an effort to improve efficiency, B.S.A., Ltd., of Birmingham, made a survey of fuel efficiency, and included in the list of items calling for detailed attention was the operation of 40 to 50 urns in various parts of the factory. A Stott No. 2 gas-heated Magna Boiler was installed as an experiment alongside one of the urns and tests were carried out. Over a period of two months, the Magna was 85% more efficient than the urn. Time and labour were also saved and the tea improved due to the freshly boiled water. Following this the company ordered 33 Magnas from the manufacturers who report that this installation has resulted in a saving of £160 a week on fuel.

Automation in the Gas Industry

Writing in the August issue of the *American Gas Journal*, the Southwestern Editor, Mr. D. H. Hale, writes that although the term 'automation' has come into popular use during the last eight years, the practice of automation is not new in the gas industry; semi-automatic controls were in use 30 years ago. These were primarily devices to shut down engines in event of overpressure and devices for the remote control of valves. Subsequent refinements made possible a form of automatic control through pressure-operated devices to stop and start compressor units, open and close valves, and perform similar tasks. Mr. Hale claims that many of the present day large diameter long distance transmission lines could not have been built or operated economically without remote controlled and telemetered compressor stations, metering stations and regulator stations. A number of companies were planning to extend shortly 'remote control' to completely unattended remote controlled compressor stations, city gates and regulator stations with one central operating point in many cases.

Mr. Hale believes, however, that completely 'automated' systems are a long way off; as they would require such huge amounts of electronic gear, that it might be economically unsound. Big advances in the utility phase of the natural gas industry will be in the use of more communications and greater instrumentation applications. Dispatching problems, system balance, maintaining load factor will be aided by increased use of telemetering equipment and supervisory controls. Greater use of computers in design engineering and in accounting will speed operations. Instrumentation and electronics are destined to be the gas industry's future 'work-horses'.

According to a recent statement in a newsletter published by the German Industry Institute, West Germany's share in world exports rose from 5.8% in 1953 to 6.7% in 1954 and to 7.1% in the first quarter of 1955. The largest proportion of this was to O.E.E.C. countries.

Oil Gasification*

By W. J. WALTERS, B.Sc., A.M.INST.GAS E. †

PART 2.

THE mechanism of the chemical reactions taking place during the cracking of hydrocarbons is complex and not fully understood, particularly those stages resulting in the deposition of carbon. It has been known for some time, however, that the reaction of carbon with steam is catalyzed by alkali and alkaline earth bases, and that the reactions of hydrocarbons with steam in the presence of such catalysts results in the deposition of less carbon.

Catalytic Gasification

Nickel and nickel-alumina catalysts have also been found to reduce the deposition of carbon and to promote the cracking of hydrocarbons in steam. Further work on this subject by H. Stanier and J. B. McKean and also by L'Office National Industriel de l'Azote (O.N.I.A.), interested originally in the production of synthesis gas, has resulted in the development of two similar processes for the gasification of a wide range of oils. Both these processes, respectively the Segas and the O.N.I.A.-G.E.G.I. processes, can produce gases having combustion characteristics not very dissimilar to, and at a cost comparable with, base-load coal gas. Also, owing to their relatively low capital cost and the rapidity with which they can be brought into operation they are very useful for meeting seasonal and peak loads.

Both these processes are cyclic and employ a 'blow' and 'run' period. During the 'run' period oil is sprayed on to the heated catalyst in the presence of steam superheated in a preheater, and the reactions which take place result in the formation of gas and in the deposition of carbon, primarily on the catalyst. The carbon is then burnt off during the 'blow' and the combustion of this carbon together with suitable quantities of oil or gas heat up the plant in readiness for the next 'run.'

The Segas Process

Following laboratory investigations and work on an experimental plant at the Old Kent Road works of the South Eastern Gas Board, a prototype commercial plant of some 800,000 cu.ft. per day capacity was erected at Sydenham. During the first 18 months' work oils ranging from gas oil to heavy fuel oil (950 sec. viscosity Redwood No. 1) have been successfully gasified giving net yields of about 1.2 therms per gal. This work has been fully described by Stanier and McKean in a recent paper to the Institution of Gas Engineers.

The catalyst employed in this process is based upon alkali and alkaline earth bases. In the initial experiments, a lime-bauxite catalyst was used, but this was replaced in the Sydenham plant by one of lime-magnesite. This was necessary as, owing to the high local temperatures generated during the 'blow,' fusion and subsequent loss of activity resulted, and a catalyst having a higher melting point was required. The lime magnesite catalyst, capable of standing temperatures in excess of 1,600°C. has been found to be satisfactory.

The plant consists essentially of three main vessels—the steam preheater, catalyst vessel and air preheater—together with their interconnecting mains and outlets to the main and auxiliary stacks, a wash box and a mechanical operator providing for the automatic operation of the various valves as required. Among the ancillary plant are included a tar and liquor separator, a Lymn washer-cooler, a relief holder and Livesey naphthalene washers. The steam and air preheaters are packed with refractory checkers and the catalyst vessel contains a 6 ft. bed of lime magnesite catalyst in the form of 2½ in. and 1½ in. diameter rings suitably stacked and supported by a brick arch. A layer of 2½ in. carborundum rings is provided on the surface to give some protection to the catalyst from the impingement of cold oil.

Air for the 'blow' can be introduced at various points, with the main supply being at the top of the air preheater; subsidiary supplies, together with heating gas for use as required, are at the base of the catalyst vessel and the top of the steam preheater. Oil can, of course, be substituted for the heating gas with advantage to the overall efficiency; gas is used on this plant for convenience.

During the run, oil sprayed on to the heated brickwork of the steam preheater and the catalyst is vaporized and together with steam superheated by its upward passage through the steam preheater passes through the catalyst bed. Here the cracking reactions take place before the gas passes through and gives up much of its sensible heat to the air preheater. Carbon is deposited on the top of the steam preheater (when using heavy oils) and on the catalyst. When using gas oil the carbon deposition is very much lower than when using heavy oils, and is confined to the catalyst vessel.

The carbon deposits are burnt during the 'blow' period by means of air preheated by its passage downwards through the air preheater and the combustion of this carbon together with heating gas added as required at the points shown raises the temperature of the steam preheater and the catalyst to the desired level.

The function of the air blow, however, is not only to burn off the carbon deposits but also to distribute the heat generated to areas where it is needed to evaporate the oil, namely, the top of the catalyst vessel and steam preheater. This heat is usually in excess of requirements towards the centre of the catalyst bed where most of the carbon is deposited and an excess of air must be supplied to remove this. When gasifying heavy oils any extra heat is required at the top of the air preheater, the catalyst bed being sufficiently heated by the combustion of the carbon deposits, but with gas oil extra heat is also required in this vessel and the heating gas is added beneath the catalyst.

The operating cycle employed is of 5½ minutes duration and is divided as follows:—

	Percentage of cycle	
Gasmaking—		
Process steam	44.2	
Oiling		32.1
Continuation steam		10.9
Blow—		
Air	47.3	
Heating gas		42.4
Purges (steam)	6.2	
Lost time between phases	2.3	
	100.0	

The injection of oil is arrested before the end of the 'run' and the steaming continued (continuation steam) until the evaporation of oil from the brickwork is complete. An upper limit to the length of the cycle is fixed by the heat capacity of the upper layers of the catalyst and the steam preheater, restricting the amount of oil that can be evaporated at any one time, and a lower limit by the minimum time necessary to burn off the carbon and to transfer the heat from the catalyst to other parts of the plant. The time required to burn off the carbon, with a given air rate on the blow is a factor limiting the output of the plant. This time is clearly less when using oils giving smaller carbon deposits and, therefore, more oil of this kind can be injected per cycle than when using oils leaving heavier deposits.

Owing to various difficulties encountered in the operation of the Sydenham plant various modifications in design are suggested for future plants. Owing to the deleterious effect of oil impingement on both the upper surface of the catalyst and the steam preheater brickwork it is proposed to introduce all the oil in a fine state of division into a vaporizing chamber superimposed on the steam preheater. It is hoped that the steam, heated to a higher temperature than before by increasing

* From a paper read to the London and Southern Junior Gas Association earlier this year.

† North Thames Gas Board.

the size of the steam preheater, together with radiation from the walls will completely evaporate the oil without impingement on any refractory surfaces.

The change in the flow of the make gases through the air preheater from upward to downward will, it is hoped, allow any condensing tar to flow to the bottom of the chamber where it can be easily removed instead of falling on to and fouling the brickwork. The gas connection between the air preheater and the washbox is to be made as short as possible and fitted with sprays to keep it clear of pitch deposits. The provision of a waste-heat boiler would provide much of the steam required, but there is not sufficient heat available in the blow gas for the plant to be self-supporting in steam.

Process Costs

From the experience gained at Sydenham an estimate of probable costs for plants having a daily output of 1 mill. and 4 mill. cu.ft. respectively has been made. These costs are shown in Table II and the capital charges include those due to all ancillary plant and other works services, and are on the basis of the plant working 240 days in the year.

TABLE II

	(*a*) 4 mill. cu. ft. per day		(*b*) 1 mill. cu. ft. per day	
	London Area	Other Areas	London Area	Other Areas
1	2	3	4	5
Heavy oil for gasification (gas yield 1.23 therm per gal.)	6.81	7.21	6.81	7.21
Oil used for heating (0.06 therm)	0.28	0.30	0.28	0.30
Purification (labour and materials)	0.07	0.07	0.07	0.07
Power for boosting	0.02	0.02	0.02	0.02
Catalyst replacement at £150 per ton—				
(*a*) 20% every 1 mill. gal.	0.10	0.10		
(*b*) 20% every 300,000 gal.			0.10	0.10
Labour and supervision (10% of labour costs):				
Four men per day at 28s. per shift	0.08	0.08	0.30	0.30
Overheads (100% of total labour)	0.11	0.11	0.33	0.33
Charges related to capital investment, including interest, depreciation, repairs, maintenance and renewals, rates and general overheads at 12% per annum	2.88	2.88	2.88	2.88
Total	10.35	10.77	11.79	11.21

(*Institution of Gas Engineers*)

The O.N.I.A.—G.E.G.I. Process

The catalyst used in this process is one developed for the production of synthesis gas from petroleum oils by l'Office National Industriel de l'Azote (O.N.I.A.). The above organization in collaboration with Gaz à l'Eau et Gas Industriel (G.E.G.I.) Humphreys & Glasgow's associated company in France, have successfully operated a plant of some 300,000 cu.ft. per day at Cahors in France.

Using the same catalyst, the basis of which is nickel together with additions to prevent 'poisoning' with sulphur, the West Midlands Gas Board have designed and operated at Solihull a plant of some 300,000 cu.ft. per day capacity very similar in principle and operation to the Segas plant. The results obtained on this plant using heavy fuel oil (having characteristics shown in Table I, column 3) were satisfactory, the gaseous yields from the 'make oil' being of the order of 1.33 therms per gal. at a calorific value of 445 B.Th.U. per cu.ft. and ranging from 1.19 to 1.32 therms per gal. of the total oil supplied to the plant. It was therefore decided to construct a plant of 1 mill. cu.ft. per day capacity working on the non-regenerative principle like the plant at Cahors. Whereas in the regenerative type of plant such as the Segas and Solihull plant the 'blow' gases pass through and give up much of their heat in a regenerator in which the steam is subsequently preheated, in the non-regenerative type these gases are led directly to a waste heat boiler in which they raise steam. The plant is so arranged that the 'blow' and 'run' gases flow in the same direction and a single regenerator heated by the combustion of oil during the blow heats the process steam. The process air heated by the combustion of the oil also passes through this regenerator. The quantity of oil used for heating is, of course, greater than in a regenerative plant but as against this no other source of steam is required which has advantages in certain locations. The plant, erected at Stafford, was only put into commission in May, 1954 and information as to the working and the results achieved are essentially preliminary.

During the 'blow' period the heating oil is burnt with the requisite amount of air in a separate combustion chamber whence, together with the process air introduced as shown, it passes into the base of the single regenerator. The checker brickwork of the regenerator is heated by the upward passage of the hot gases which then pass into the catalyst vessel where they burn off carbon deposited during the previous 'run'. Steam is raised by the passage of these hot waste gases through the waste heat boiler.

During the run process steam is admitted at a certain point in the regenerator and this together with oil sprayed on to the surface of the catalyst and there vaporized passes downward through the catalyst bed where the cracking reaction takes place and carbon is deposited. The make gas leaves the plant by way of the washer scrubber and passes through the initial purification stages shown. The formation of difficult emulsions is prevented by hot detarring at a temperature of 120°F.

These results show that the performance at Solihull, using the same type of catalyst, had not then been achieved at Stafford, further work on the operating conditions being necessary.

The catalyst bed originally consisted of two layers, the upper one being of a granular material having a nickel content of about 10% and the lower layer a pebble-like material of unknown nickel content. The removal of the upper layer has been found to give a gas having a higher calorific value and results are shown using the lower layer only. An important feature of this process is the high CO_2 content of the gas which is attributed to certain reactions of the catalyst:—

(1) $Ni + \frac{1}{2} O_2 \rightarrow Ni O + 58.5$ cal.
(2) $NiO + CO \rightarrow Ni + CO_2 - 9$ cal.
(3) $2 NiO + C \rightarrow 2 Ni + CO_2 + 22.8$ cal.

Reaction (1) takes place during the 'blow' and (2) and (3) during the first few records of the 'run.' As the volume of CO_2 produced per cycle is constant hence the shorter the cycle the higher the percentage in the gas produced (see Table III).

As in the Segas process, however, the reaction of CO with excess steam according to the reaction:—

$$CO + H_2O \rightarrow CO_2 + H_2$$

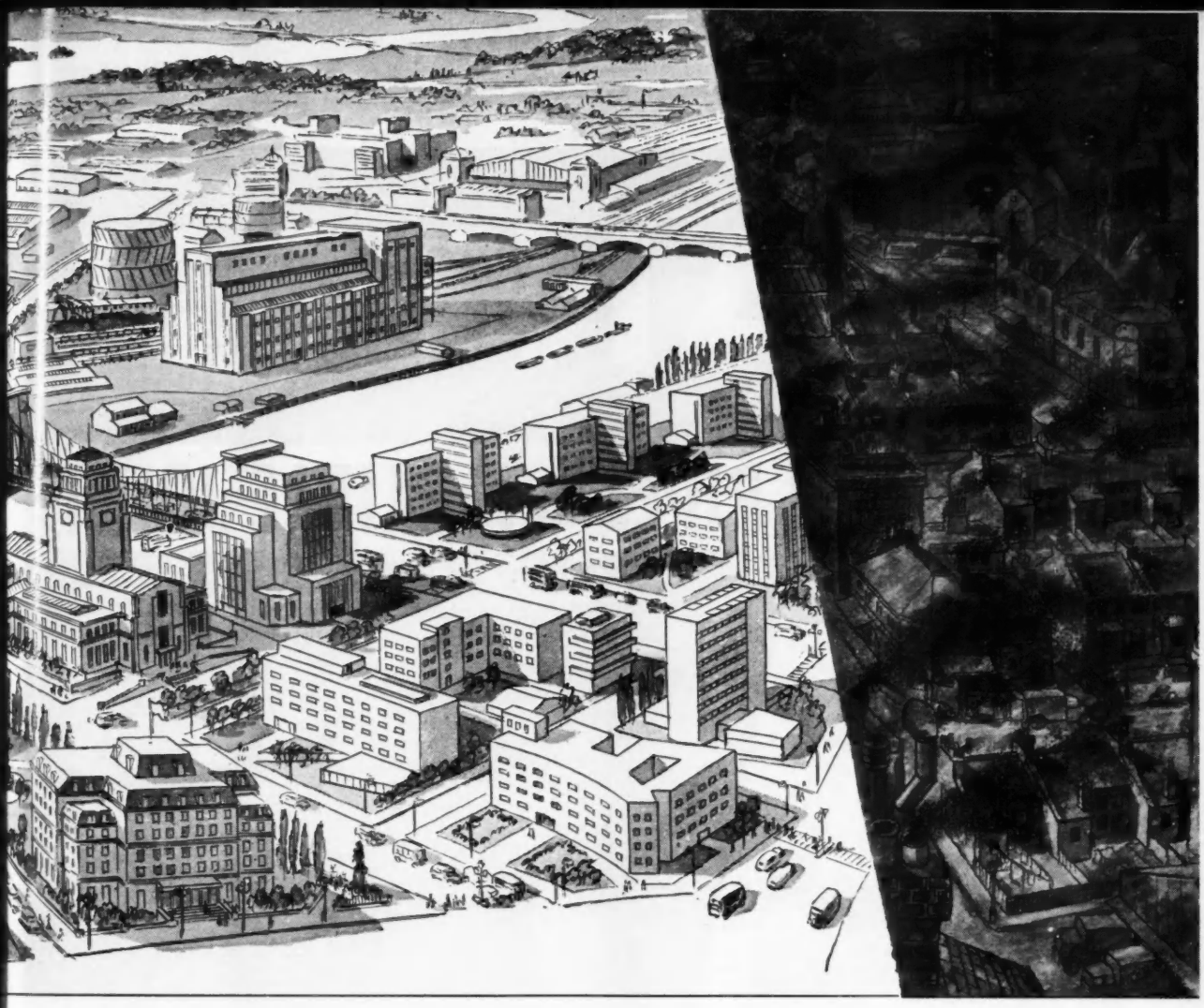
must also be productive of CO_2 at the temperature of operation used.

Control pyrometers are inserted into the catalyst bed and temperatures of the order of 1600°F. are employed. These are somewhat less than those employed in the Segas plant. The cost of producing and purifying gas with the plant working as given for 300 days per annum is estimated to be 10.619 pence per therm when using oil at 8$\frac{13}{16}$d. per gal. and capital charges of 0.755 pence per therm. While this is capable of some reduction with improvements in plant efficiency it is nevertheless comparable with the cost of base load coal gas.

DISCUSSION

Mr. J. B. McKean, South Eastern Gas Board, opening the discussion, said they had heard an excellent survey of a wide variety of processes which had from time to time been developed to convert petroleum oil fractions to combustible gases. He could think of only two which he had omitted, namely, that of Semet Solvay—which was akin to the Hall process and the Kopper-Hasche process. The reasons for the development of these various types of processes were worth considering. In the United States, as pointed out by the President of the Association in his address at the opening session, town gas consisted mainly of methane, and efforts to augment the supply, during periods of peak demand, by cracking oil had been mainly directed towards the production of high B.Th.U. gas. For many years gas made from a selected fraction of oil had also been used in Europe to meet seasonal loads by the carburetting of blue water gas, but there was a limit to which this could be done if regard was paid to gas characteristics, as it should be. With the falling availability of coal to the gas industry, particularly in the United Kingdom, an alternative raw material for producing gas having characteristics similar to coal gas had become highly desirable and some effort had, as a result, been directed to the development of processes making 450 to 500 B.Th.U. gas from the low priced fractions of petroleum.

Mr. McKean continued that one almost sensed in Mr Walter's opening remarks a note of despondency that the availability of fuel oil to the gas industry would tend to fall since the importation of crude oil for refining would be



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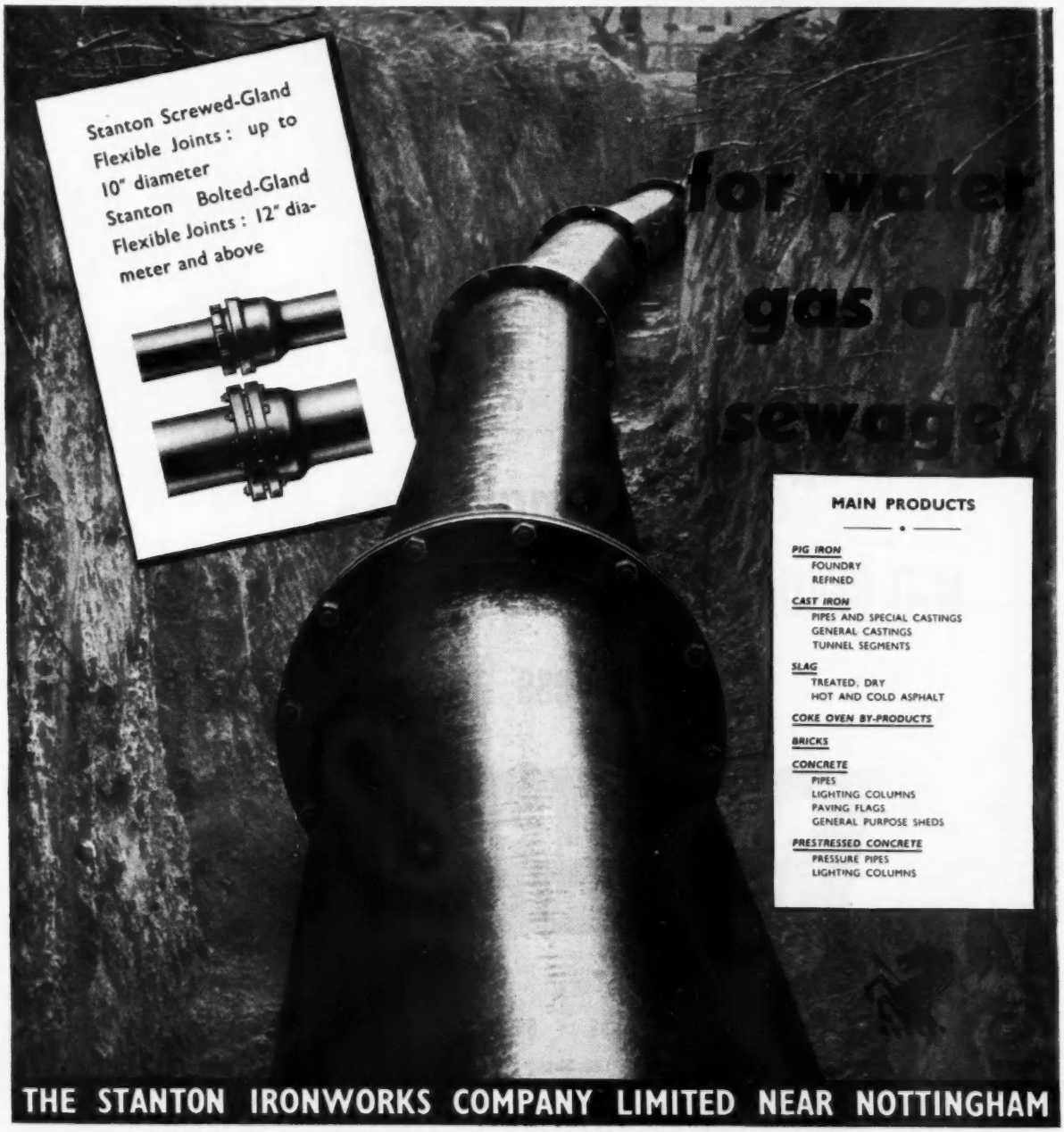

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TABLE III

The gas as made prior to entering the main works stream possesses the following typical characteristics. These figures have been selected at random, but cover the two cycle times, the range of calorific values obtained and results with and without the " K " catalyst layer.

	10 min. Cycle with Two Layer Catalyst			8.7 min. Cycle with Two Layer Catalyst			8.7 min. Cycle with Single Layer Catalyst only		
Average calorific value of run	430	447	475	440	457	490	460	480	496
1	2	3	4	5	6	7	8	9	10
Date	19.5.54	28.5.54	28.5.54	2.6.54	15.6.54	26.7.54	19.8.54	11.8.54	10.8.54
Specimen gas analysis—									
CO_2	10.1	10.5	14.0	12.0	13.5	12.8	12.2	9.0	10.4
C_nH_m	1.7	3.0	5.4	4.2	3.5	3.9	3.6	3.4	3.4
O_2	0.1	0.2	0.2	0.2	0.3	0.2	0.4	0.4	0.4
CO	24.2	22.0	15.7	20.1	16.7	16.7	15.5	17.6	19.4
H_2	46.5	45.6	46.3	45.0	46.3	48.3	41.4	44.6	38.8
CH_4	14.4	15.3	15.2	15.1	15.4	14.4	19.8	16.2	23.0
N_2	3.0	3.4	3.2	3.4	4.3	3.7	7.1	8.8	4.6
Specific gravity	0.57	—	0.61	—	0.62	0.63	0.60	—	0.62
Cyclic heat oil (gal. per 1,000 cu. ft.)	0.78	0.67	1.30	0.72	0.87	1.00	1.13	1.19	1.15
Make oil (gal. per 1,000 cu. ft.)	3.3	3.72	4.49	3.59	3.51	4.66	4.26	4.35	4.54
Total oil (gal. per 1,000 cu. ft.)	4.08	4.39	5.79	4.31	4.38	5.66	5.39	5.54	5.69
Therms per gal. oil make	1.31	1.21	1.06	1.20	1.30	1.05	1.12	1.10	1.09
Therms per gal. total oil	1.06	1.03	0.82	0.99	1.04	0.86	0.90	0.87	0.87
Efficiencies— (Oil at 18,300 B.Th.U. per lb.)									
Therms in gas (%) therms in make oil	74.0	68.4	60.0	67.8	73.5	59.3	63.3	62.1	61.5
Therms in gas (%) therms in total oil	60.0	56.4	46.3	55.9	58.8	48.6	50.9	49.2	49.2

governed by the demand for lighter fractions. Was not the true picture that, even though this demand might not increase, with the rising demand for the middle oil fractions greater quantities of the lighter and heavier ends would become available? It was now common knowledge that the South Eastern Gas Board was examining a project for a major works for the direct production of town gas from whatever low priced petroleum fractions were available. At least one process was known which was capable of producing, without modification to the plant, a gas of the desired characteristics either from light or from heavy ends. As the proportion of carbon to hydrocarbon in the fraction decreased, so the efficiency of the process increased.

On the more technical aspects of the paper it was worth noting that in all the processes described that evening the method of operation was cyclic, a 'make' period being followed by a 'blow' period. In those processes in which oil only was used, the same line of thought might have governed their development, namely that the ratio of carbon to hydrogen in the raw material was appreciably higher than in the gas produced, and that inevitably carbon would require to be burnt out of the reaction vessel after the treatment of a suitable quantity of oil. The rate at which heat is absorbed by the endothermic gas producing reactions would govern the duration of the 'make' period; the carbon which had been deposited during this phase thus provided a convenient and efficient means of restoring the heat lost and, moreover, at the point where it was required. Special means of controlling the heat generated during combustion of the carbon might or might not be required depending on the robustness of the contact surfaces in the reaction vessel. Although cyclic processes have been successfully developed, they have, however, a number of inherent disadvantages and the desirable goal would be one giving continuous production.

Finally, regarding the Segas process, Mr. McKean said more recent work on heavy oil had shown that an appreciable economy in steam could readily be obtained and that there was a close balance between the steam used and that raised from the waste gases. The process was almost independent of steam from external sources, and could be made so by burning only a small proportion of the tar produced at the waste heat boiler. Light petroleum fractions had also been successfully and efficiently gasified and the process was entirely self-supporting in steam; indeed, there was a slight surplus. The gas produced was low in CO_2 and was fully interchangeable with coal gas.

Mr. J. A. Prigg, North Thames Gas Board, said Mr. Walters had brought together the various processes for making gas from oil; he had told how the gases were made and of what they consisted. He had also made some very sound remarks on the combustion properties of the gases. It was on the latter aspect that Mr. Prigg wanted to add a few remarks. The British gas industry had grown up around the use of coal gas supplemented with carburetted water gas. Appliances in the district were set to give stable flames, good combustion and satisfactory service to the consumer with this range of gases. Using new gases in such a system might mean that the existing appliances would not give the same standard of performance. Some reduction in performance might be tolerable at times of peak load—bearing in mind, of course, that safety must at all times be preserved—but as a replacement of the old gas a marked difference in performance was undesirable.

It was obviously difficult to specify which gases would be satisfactory in all the various appliances on a given area of supply. Practical tests with the new gases on at least some of the appliances were necessary to ensure precise information on that point. It was desirable, however, that an approximate answer should be given by calculation and several methods of predicting interchangeability had been proposed from time to time. They had examined a number of these at Watson House, and had found that the methods proposed by Weaver in America and Delbourg in France indicated the trends to be expected at least to a first approximation. The two methods appeared to be very different but they had been able to establish a link between them. Both methods relied upon the calculation of the combustion characteristics from the analysis of the gas and in this they were not above suspicion. They served, however, to indicate the possible gases or mixtures of gases which would be of use and those preliminary estimates could be checked with practical tests on appliances.

Of the gases mentioned by Mr. Walters in his paper, said Mr. Prigg, it would be seen that gases made in the O.N.I.A.-G.E.G.I., Jones and Segas plants were within the interchangeable region while those made in the G.L.C.C. peak load and Hall gas plants were not. The latter gases could, however, be brought within the interchangeable region by suitable blending. For many of the hydrocarbon gases with their high calorific values and low flame speeds, blue water gas would probably be a suitable diluent. The Beaver Report, however, as Mr. Walter had mentioned, suggested limitations on further use of this gas. Mr. Prigg wondered if the author or his colleagues could produce a diluent gas rich in hydrogen by some means. Such a gas would solve many of the problems of the extensive use of these gases.

Mr. A. B. Densham, North Thames Gas Board, said he would like to say a few words on the evaluation of oils, particularly for carburetting water gas. It was generally agreed that the paraffins were the most valuable components, since the aromatics tended to deposit carbon, and the naphthenes lost hydrogen and were converted to aromatics. The Griffith method of analysis was inapplicable to heavy oils, which could not be distilled at atmospheric pressure without decomposition. The most reliable method of analysis involved the determination of the C/H ratio before and after selective hydrogenation of aromatics to naphthenes, but specialized equipment was required for the reduction. The n-d-M method, depending on

measurements of refractive index, density and molecular weight, was also reliable. But it was difficult to measure the refractive index of a dark oil. Chromatographic separation of paraffins and naphthenes was difficult, particularly for the heavy oils. There was also the possibility that mixed types of hydrocarbons were present, with paraffin and naphthene or aromatic parts in the same molecule.

Van Nes and Van Westen had stated that the viscosity gravity constant (VGC)=0.0110% aromatics+0.00925% naphthenes+0.00743% paraffins. The North Thames Board had checked this equation for 70 mixed type liquid hydrocarbons of molecular weight 200 to 700, for which viscosity data was available in the literature, and found good agreement. But the equation did not give the percentage of paraffins in terms of the VGC unless the ratio of aromatics to naphthenes was known. However, if the VGC was plotted against the percentage of paraffins for the above 70 hydrocarbons, quite a good straight line was obtained in the middle part, with some scatter at either ends. From the slope of this line % paraffins $=430\ (1-\text{VGC})$. They had checked this expression for one or two oils of known composition in the laboratory and found quite good agreement.

A similar expression could be derived relating C/H ratio and composition. But the values of the coefficients depended on the degree of condensation of the rings, and there was very little difference between the coefficients for cyclohexane and paraffin. The viscosity index was widely used in the oil industry as a measure of the change of viscosity with temperature, but was not a measure of the composition. The parachor had been suggested as a means of analysis. But what little data there was indicated that it was not very reliable.

One great advantage of the VGC was that it was very easy to measure. The specific gravity could be measured at room temperature with a hydrometer, and corrected to 60°F. The viscosity, which occurred as a logarithmic term, need only be measured to within ± 10%, so that no precise temperature control was necessary.

It was proposed, concluded Mr. Densham, to carry out measurements of VGC on a variety of oils used for carburetting, and to see how the calculated percentage of paraffins correlated with the thermal yield.

Mr. T. B. V. Hirst, Tekon, Ltd., hoped he was wrong in taking it that the middle section of the slide Mr. Prigg had shown related almost exclusively to the present extremely primitive burners which were available in this country, and not to the burners as they might be and were in other countries. Mr. Hirst thought it was true to say that most of the gases outside the central section of Mr. Prigg's graph could be burned very well indeed. The difficulty was, it seemed, that they were up against a period of intense experimentation to find out, if they could, what sort of gas was to be made in the future. That was a necessary evil which he hoped would not be unduly prolonged. There was also the point that the most used gas appliance was the gas cooker. The gas cooker, as they knew it in this country, invariably had atmospheric burners, and combustion always took place more or less in the open and not in the closed combustion chamber. When they considered other appliances they came across non-atmospheric burners used in open combustion chambers, and then there was a different set of conditions. Questions arose as to heat transfer which could be very much affected by changes in gas characteristics. That was often forgotten and an even more vital point was the effect of changes in gas characteristics on the life of the gas appliances. Those things could have serious financial repercussions.

Mr. A. E. Livett, North Thames Gas Board, wondered how many engineers who were producing oil gas used flueless heaters in their homes. Recently he went into a home where there was a flueless heater, and it reminded him of a pre-war oil-stove. If a gas radiator was put in and burned the oil-gas which they were receiving at the moment, there was a distinct smell of oil.

Mr. J. D. C. Woodall, South Eastern Gas Board, drew attention to the costs mentioned at the end of the paper. In general, he said, they seemed to be about the same as those involved in making ordinary gas in an ordinary gasworks. On the other hand, the author spoke about low-priced fractions the oil company might have to offer. Was the gas made from low-priced fractions, or might they expect something cheaper in the future?

Mr. R. K. Harrison, Southern Gas Board, referred to distribution. He said he would be very much happier to distribute the gas which contained little or no carbon monoxide, particularly in view of the publicity caused by mishaps due to leakages. He wondered whether the manufacturing specialists could concentrate some of their efforts towards reducing the carbon monoxide rather than increasing it in the new process.

Mr. E. A. K. Patrick, North Thames Gas Board, said he felt he would be right in saying that the utilization boys would not fear the challenge of having to design equipment to work satisfactorily on any of the new gases, nearly as much as they feared a fluctuating mixture. That was already a problem with the grid systems.

Mr. A. F. Grant, North Thames Gas Board, said he thought it was of note that the French had tried to remove the carbon monoxide in their gases and had built a plant to do it. He hoped Mr. Harrison realized what it involved. It meant the extra cost of the plant, the extra cost of removing carbon monoxide formed in the oils, and loss in the carbon monoxide fuel content.

Author's Reply

Mr. Walters said that if a note of despondency were noticeable in the opening remarks of his paper regarding the availability of fuel oil, it could be due only to his wish to emphasize the need for the gas industry to be able to use any of the surplus fractions of the oil refining process. Only thus would they become available at suitably low prices. These prices would have to be such as to enable gas to be produced at a cost comparable with that resulting from existing raw materials. While it was true that some oil gasification processes produced gas having a carbon monoxide content higher than most town gas (although less than in carburetted water gas), he did not feel that large efforts towards its reduction in new plants, or indeed in general, could be justified if the price of gas were to be appreciably increased as a result. As had been pointed out, plants for the removal of carbon monoxide had been used on a relatively small scale in France and Germany. He would have thought that efforts could be more usefully directed towards the development and installation of foolproof safety devices.

INCREASING PRODUCTIVITY

The British Welding Research Association is arranging a number of meetings on *Increasing Productivity by the Use of Welding* to be held at various centres throughout the country. The second meeting is in Bristol on Tuesday and Wednesday, October 4 and 5, 1955, in the demonstration theatre of Electricity House, Colston Avenue, Bristol, 1, by kind permission of the South Western Electricity Board. Papers will be presented as follows:—

Tuesday, October 4.

9.30-11.00 a.m.: Recent Developments in Welding Steel, by A. R. Muir, B.SC.

11.30-1.00 p.m.: Welding Medium Carbon and Low Alloy Steels, by C. L. M. Cottrell, M.SC., PH.D.

2.30-3.30 p.m.: Developments in Non-destructive Testing, A. L. Carson, B.SC.

4.00-5.00 p.m.: Developments in Non-destructive Testing, A. L. Carson, B.SC.

The Chairman in the morning will be Dr. J. G. Whitman, PH.D., and in the afternoon Mr. C. Key.

Wednesday, October 5.

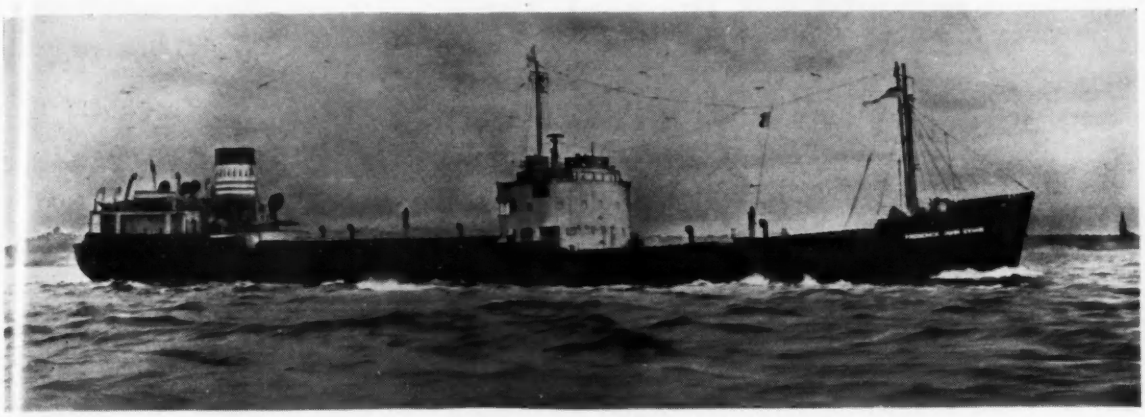
9.30-11.00 a.m.: Processes for Welding Light Alloys, by W. G. Hull.

11.30-1.00 p.m.: Metallurgical Aspects of Welding Light Alloys, by P. T. Houldcroft, B.SC.

2.30-5.00 p.m.: Resistance Welding Ferrous and Non-ferrous Metals.

Chairman for the day will be Mr. H. J. Pollard.

Admission is by ticket which may be obtained free of charge from The Organizer, British Welding Research Association, 29, Park Crescent, London, W.1. Owing to limited accommodation, applicants are asked to state whether they wish to attend on both days.



A 'North Thames' collier of the same class as the 'David Pollock.'

600 Miles by Ace Collier

'Gas Journal' Reporter Colin Godbold has just returned from a round trip from the Thames to the Tyne aboard the S.S. 'David Pollock'

HO!' roared the coal trimmers' foreman and with a crash the giant grab clutched another three and a half tons of coal from the hold of the s.s. 'David Pollock.' It was two o'clock in the morning and No. 1 Pier, Beckton gasworks, was floodlit as the last two holds were cleared in time for the ship to catch the tide.

I stood nervously on the quayside, contemplating the ten-foot gap between myself and the ship, and the grab, swinging glistening, overhead. A little later, having tasted coal-dust, I pushed myself into a corner of the wheelhouse to watch the routine, the daily drama, of a ship preparing to leave her berth.

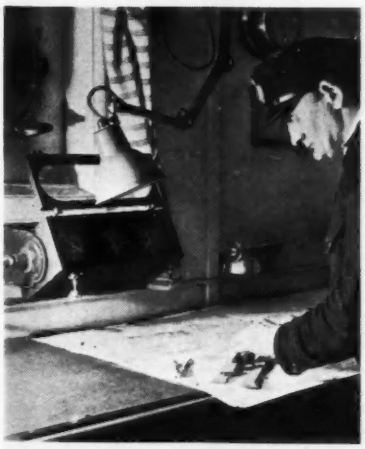
At a quarter to three the four sliding steel hatch-covers were clamped down, the floodlights were switched off, and the pilot had warned the River Thames with three blasts on the ship's whistle.

In the darkened wheelhouse the dapper, confident pilot drawled his orders to the phantom-like 'Geordie' at the wheel, whose face was ghostly in the light of the binnacle.

'Starboard a half.'

'Starboard a half, sir.'

The peal of the engine room telegraph. And one of the North Thames Gas Board's ace colliers, one year after its maiden voyage, was under way for the Tyne.



The course is plotted with the aid of the 'Decca Navigator.'

The Master

Talk of ships and the sea interests most people. Talk of colliers interests fewer—one thinks of dirty little slaves of coastwise drudgery. I can tell you now that this is not true—of the North Thames Gas Board's fleet at least. The seamen on this run know as much, and have as much of the stuff of the sea in their hearts, as any deep-sea man.

Pacing the bridge of the 'David Pollock,' as alert as if on his first voyage, was the master, cigar-smoking Captain Anthony (Lucky) Mordue, from South Shields. At 64 years of age he is just as fit as the sea demands and, incidentally, still ruggedly handsome.

He became known as 'Lucky Mordue' during the war. Nine North Thames colliers were lost by enemy action—none was Captain Mordue's. Somehow or other the day-long aerial attacks, the lurking U-boats and heavily mined waters were all taken in his stride. He always came back.

Luck? Eternal vigilance on the 30-hour run, that's how much Captain Mordue thought—and thinks—of luck.

In fact, a few years ago Captain

The Master of the 'David Pollock'—Captain Mordue.

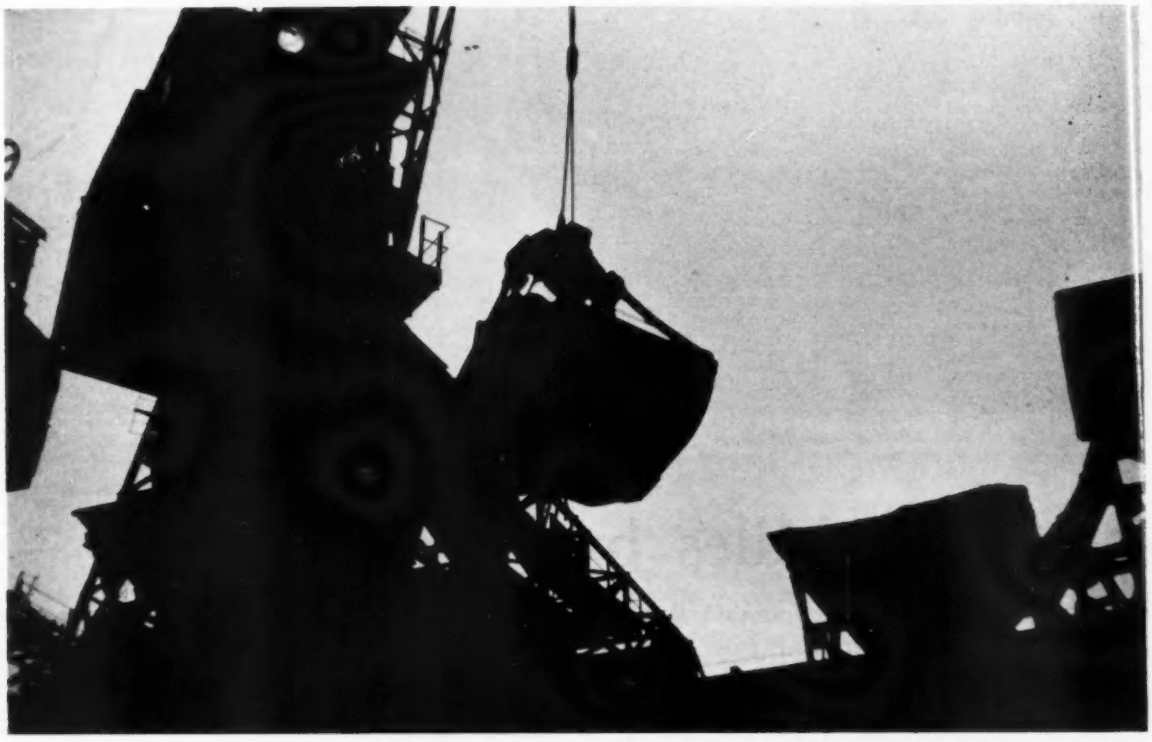
Mordue was not so lucky. He was commanding the 'Flamma' and, unusually, was ordered to Rotterdam. On the voyage one of those endless, storm-racked nights made life a torture for even the hardened crew. A gale lashed the shuddering ship; tremendous waves thundered on to the hatches. The 28-year-old newly-married cook ran for it towards the poop in what he thought was a lull. But a standing wave was poised overhead, and he was swept overboard by its force.

Even in these nightmare conditions, Captain Mordue turned the ship about to look for him—a hopeless task.

Fogbound!

With little left of the night I went to my cabin. So far as I was concerned the ship's progress through the Thames, in the dark, was likely to be uneventful—I thought.

Half an hour later I was awakened by shouted orders and the urgent blowing of the ship's whistle. By the time I



Dusk—and the giant swinging grab shows stark against the sky.

reached the bridge to see what the trouble was the ship had anchored. We were fog-bound.

The Thames was blotted out—visibility was less than five yards. Lookouts had been posted in the now invisible bows. The radar screen showed that all other traffic had also come to a standstill.

Tired and depressed by the gloom I returned to my bunk. But the clanging bells about the river and the whine of the radar motor excluded sleep.

Accommodation

Daybreak came 'fine and clear' and after breakfast I took my first proper look round the ship.

Between the forecastle and the wheelhouse are two large holds, and two more lie behind the wheelhouse before the poop. The wheelhouse, chart room, and wireless room are situated over the top of the officers' quarters.

(Above). Dawn is breaking—and the fog has gone.
(Left). Captain Mordue scowls at the sailor's enemy—fog.

I doubt if many deep-sea ships can boast anything better than these. They all have panelled walls, pile carpets, a wardrobe, a reading lamp and an electric fan. The bunks can be surrounded by a curtain, like a four-poster bed, presumably to obviate noise and light when off watch during the day. A loudspeaker relays programmes from a special receiver. The Captain has his own suite comprising day-room, bedroom, which he rarely finds time to use, and bathroom.

The officers' saloon is tastefully furnished with an inlaid table and armchairs. An upholstered seat runs along the room in the modern style. The Chief Steward, Mr. T. J. Taylor, served food through a hatch to his assistant.

Adjoining the officers' saloon is the smoke room, both restful and practically designed so that one can read or play cards or chess. There is a little library.

The men's quarters aft are, surprisingly very similar. Let me say here, and it

A blast on the ship's whistle and the 'David Pollock' moves away from the staiths. She is grimed with loading-dust and the hoses will soon be at work.

will be hard for an ex-mariner to believe, that there were absolutely *no* complaints about the accommodation or working conditions aboard. Every man and boy has his own cabin; each cabin has a cooling fan (in the North Sea!) a comfortable bed-type bunk, a writing desk and a locker, grained to resemble a wooden wardrobe.

Near the ship's main galley is a large refrigerated room for perishable stores. The firemen have their own clothes-drying room.

While I walked round I made good friends with 24-year-old Able Seaman Joe Hunter. He was married, with a four-year-old baby girl. (At Newcastle later a very excited Joe told me that on Christmas Day his family is expected to become a little larger.)

He has been nine years at sea. About half of these were spent 'deep-sea.' 'It gets into your blood,' he said. 'But this is all right, mon. I see the wife every week. Away from the coast I was once away from her 13 months.'

And the accommodation? 'Aye, it's really great. I have never seen anything like this on any other ship. This'll do me.'

One could see Joe had made a second home on that ship. A few books lay on a shelf. Newspapers protected parts of the floor of his cabin from the dust and wet of his boots. His soft Tyneside lilt, like the rest of the crews', seemed part of the character of the ship. There were another four A.B.'s, a donkeyman and three firemen; a cook and two assistant stewards, and two deck-boys.

More fog threatened as the 'David Pollock' sped on smoothly at 12 knots. About mid-afternoon the approaches to the fog could be seen. Our estimated time of arrival in the Tyne was six a.m. the following day, so that as we hit the fog at five that afternoon we were in it, according to the forecast, for the rest of the journey to our destination.

The forecast was right. As we steamed cautiously into the thick grey wall, the Captain could not even see the lightship he was looking for to check the accuracy of his course. He could hear it, about a cable's length away on the port bow, but only its forlorn bellow and the spot on the radar screen told him where it was.

Navigation Equipment

This was my opportunity to see the navigation equipment at its best. The Decca Navigator is, I believe, more or less standard equipment on coastal ships. It is a radio receiver recording transmitted impulses from variously placed land stations which enable the officer on watch to check his position on a specially drawn chart.

Then, as I have already mentioned, there is the radar, or Marconi radio locator Mark IV. Captain Mordue has been on a two weeks' course to get the hang of this. Most people are familiar with its function, but at sea it is used for general navigation and is particularly useful in fog or in tricky positions in the dark. Switch on the current and there you have the relative positions of the land, vessels and sea-marks up to radii of one, three, ten or forty miles, marked off in circles so that the distance can be gauged. Direction of travel of other ships can also be seen. 'Better than television,' said someone, not quite used to the novelty of it. There was also a Kelvin Hughes depth-recorder.

Wireless Officer David M. Wordsworth, a Marconi employee from Carlisle, who is not yet 19, showed me the room full of complicated up-to-date wireless equipment he has to deal with.

Among this can be distinguished the

Two able-seamen and an apprentice deck-boy fix the cover after a job of work on a lifeboat. Nearest the camera is 24-year-old Joe Hunter.

A tug swings the ship towards the mouth of the Tyne.

wireless/telegraphy main and emergency transmitters and a receiver; a wireless telephony receiver/transmitter; and automatic devices for picking up S.O.S. messages when the operator is off-watch and for keying distress signals from the ship after the wireless room has of necessity been abandoned.

That night there was no sleep for the Captain. He must be on the bridge in any 'situation' and fog is certainly a situation.

In the morning the 'David Pollock' dropped anchor just outside the Tyne and joined the chorus of ships hooting for a pilot. The fog was thicker than ever—although the forecast said it would lift a little by two p.m.

While we were waiting the second officer looked at the radar. 'What's this coming for our starboard beam', he said.

Tensely, the lookouts and third officer tried to see further into the murk. Finally, a shadow appeared, darkened, threatened. It was a large fishing boat which seemed to have little regard for where it was going in spite of our warning bell. Everybody made a clatter and tried to attract the boat's attention. About 100 feet away he saw us, reversed his motor and managed to check his boat. As a reward for our vigilance the skipper threw a basket of assorted fish aboard. I should think so too. If the boat's wooden hull had hit the steel sides of the 'David Pollock' she would have been several tons of driftwood.

The Fleet's Managers

In Newcastle the next day I went to see Mr. S. Rochester, Deck Superintendent for Stephenson Clarke, Ltd., who manage the North Thames Gas Board's collier fleet. 'We managed them for the Gas Light and Coke Company since they owned their own ships on this run,' he said.

Mr. Rochester told me there are now 25 ships in the North Thames fleet. Four of them are in the same class as the 'David Pollock'. These other four are: 'Frederick John Evans', 'Sir David I', 'John Orwell Phillips' and 'Thomas Goulden.' All these are of 4,600 tons. There are five others of about 4,000 tons or more; nine more of 2,700 tons; and the remainder are around 2,000 tons.

Some still have the cumbersome wooden hatches over the holds. Naturally, the crews rather envy the ease of working of the folding steel hatches of the more modern types.

Southbound

For the return journey the Captain had decided to make steam for noon. I caught a train for South Shields and arrived at the coal loading staiths dead on time. The coal-shutes had filled the holds in a matter of hours and now the ship was bound for the South again—with a full load. Beckton would get its coal and southern families would get their gas and coke. But it's hard luck on the collier seamen that the peak-load demands come in winter—just when the North Sea takes the most out of the man. It is still a tough life in these days of quick turn-arounds, despite the many improvements and aids to navigation.

Captain Mordue's officers and men were, with the exception of the apprentices—first class experienced seamen. Second Officer John H. Pickering, at 28 years of age, holds his deep-sea master's certificate. He is to be married shortly, which is why he prefers the coast.

In the engine room I met Chief Engineer R. Herdman, who has spent a lot of his life in Far Eastern waters; his second Mr. J. Whitehead, and the third engineer, Mr. W. S. Rutter.

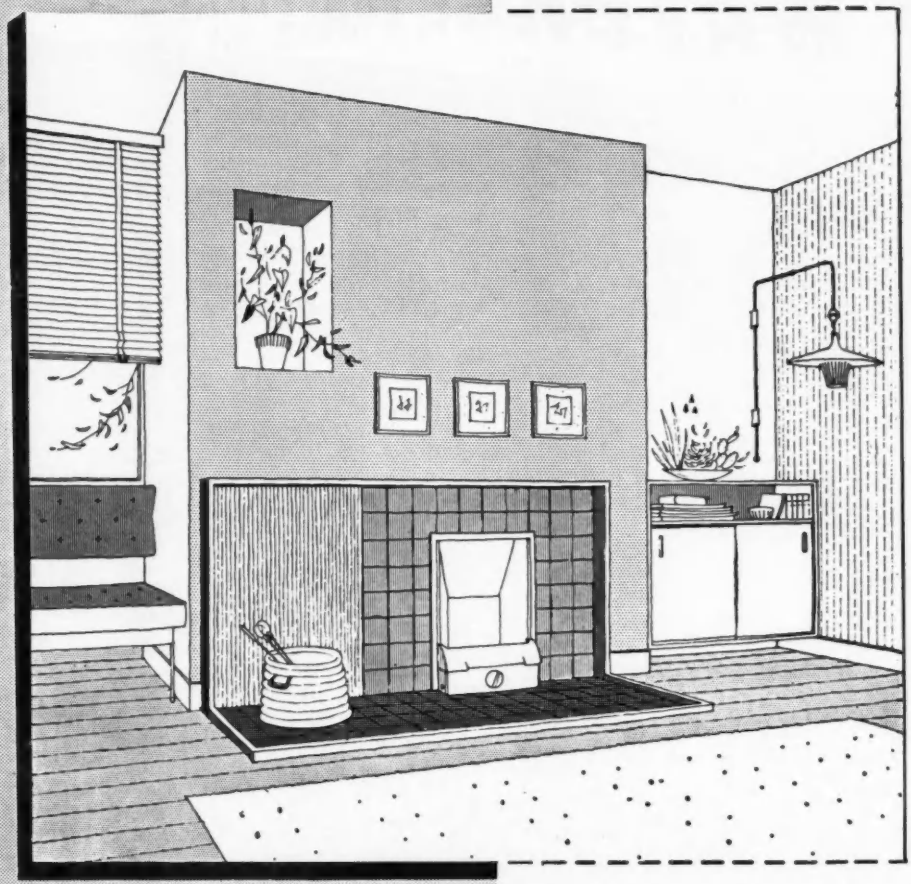
The end of the voyage came almost as an anti-climax; a small electric storm in the Thames was all that happened before the ship was secured to the buoys while waiting for another ship to leave Beckton Pier. I waved goodbye to the crew from the boat and felt a little sad. For a few days I had felt a part of the great, ceaseless, coal-by-sea race.

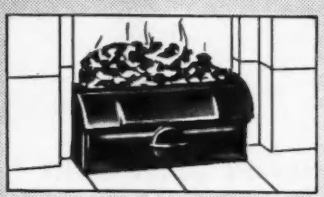
The North Sea was in an angry mood when this picture was taken of an 'up-river' ship.

THE HANDSOME, EXTRA ECONOMICAL

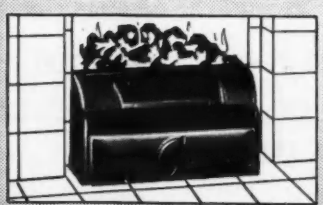
No. 25 LOWBURN

a continuous-burning gas ignited fire which thrives on COKE





Standard



Trivet

Look at the low front. The Lowburn's front is two inches lower than the average continuous-burning fire of this type —and very pleasing to the eye. It is available in a wide range of colours.

Low costs—to buy, install and run. The No. 25 Lowburn is an approved appliance which burns for 10 hours without attention on all recommended fuels—especially COKE.

Built-in gas ignition burner available left or right hand or concealed supply.

The standard extension piece looks elegant during the day and, at night, when in raised position for overnight burning, it acts as a safety device by preventing live fuel from falling out on to the floor.

The alternative extension piece, which can be supplied instead of the standard fitment, serves as a useful trivet during the day.

For full details of the No. 25 Lowburn fire, write to the Housing Division of:—

ALLIED IRONFOUNDERS LTD

Makers of cookers, boilers and fires

28 Brook Street, London, W.1

Introducing —

HOT WATER at the fingertip with

★ NO MAINTENANCE CONSUMPTION OTHER THAN PILOT

★ THERMO CUT-OFF SAFETY DEVICE

★ RADALOY HEAT-EXCHANGER

★ FORWARD VENTING FLUE OUTLET

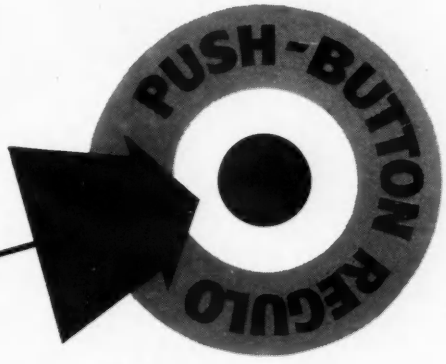
★ MAIN GAS AND PILOT FILTERS

★ VITREOUS ENAMEL FINISH

the NEW WORLD S30 SPEEDLYN

by just pushing the REGULO button a few minutes before it's needed

The NEW WORLD S30 Speedlyn
is a rapid-heating storage sink heater
with PUSH-BUTTON CONTROL



INPUT – 15,000 B.Th.U/Hr.
CAPACITY – 1½ gallons
WATER FLOW – 1 gallon in 30 seconds

THE LATEST MAINTENANCE-FREE NEW WORLD PRODUCT OF Radiation Ltd **WATER HEATER**

RADIATION GROUP SALES LTD. 7 STRATFORD PLACE, LONDON, W.1 · *Tel:* MAYfair 6462

1855

In 1855 Robert Dempster, a young Gas Engineer, founded at Elland a small Works for the production of all types of Gas Works Plant.

Today the business has grown into an organisation known throughout the entire Industry, playing its part in the field of technical advancement.

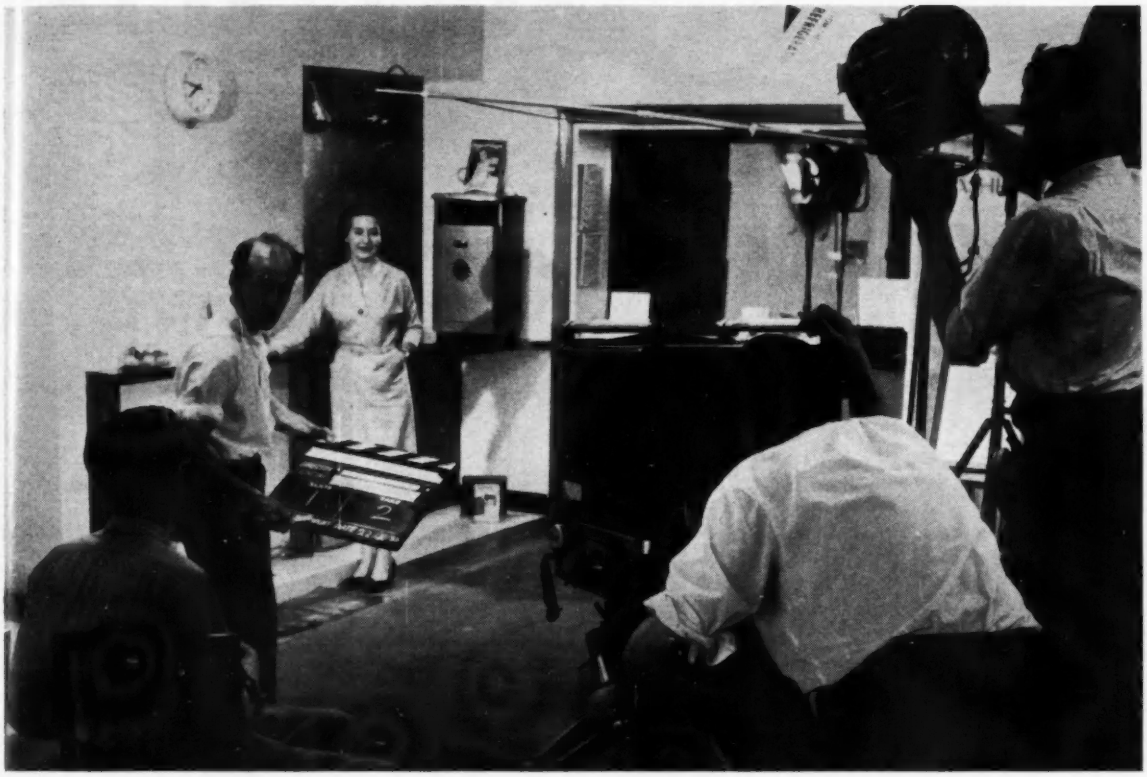
1955

ROBERT DEMPSTER & SONS LTD.

ELLAND, YORKSHIRE

DE DEMPSTER-ELLAND

GASHOLDERS · PURIFIERS · HORIZONTAL CARBONISING PLANT
CONDENSERS & STATIC WASHERS · MECHANICAL HANDLING PLANT FOR COAL, COKE & OXIDE



This photograph was taken during the shooting of the first commercial gas film. Beryl Mason introduces the Radiation gas and coke fire.

Two Boards for Commercial Television

A film featuring a gas and coke appliance will be the gas industry's first commercial television 'spot' to be presented as a joint effort of the South Eastern and North Thames Gas Boards on October 1

This is the first of a total of seven one-minute advertising periods booked by the two boards in the first six months of commercial television.

Mr. Leslie Hardern, North Thames Public Relations Officer, and Mr. A. E. Tullberg, South Eastern Publicity and Information Officer, are working in consultation with Coleman, Prentice and Varley, the advertising agents, to produce these commercial films, in which 'purely prestige advertising will not be considered.'

The London transmission of the Independent Television Authority will cover the whole of the North Thames area and the South Eastern area as far down as the borders of Kent and Sussex.

Radiation Fire

The appliance to be featured in the first spot will be a Radiation gas and coke fire. The programme will be introduced by Miss Beryl Mason, a West End actress, who has been in many films and has appeared on B.B.C. television. She has had parts in 'See How They Run' and 'On Monday Next. . . . .'

Publicity in gas showrooms and elsewhere will call attention to the television advertisement, and also there will be a certain amount of following-up.

All the initial spots will take place on Sunday or Saturday evenings at what are known as peak or 'semi-peak' periods. The South Eastern Gas Board claim that these first bookings are in the nature of an experiment to test the powers of T.V. advertising.

The September issue of *Segas Sales News*, the South Eastern Board's magazine says: 'Mr. Therm has always been up with the leaders in making use of new promotional media. The Board feels that a sales staff doing a good job deserves the best supporting publicity that can be given, and the latest is T.V. We are taking a long term view of it. It may prove in time to be the most powerful propaganda weapon of them all and we want to be in on the ground floor.

Certainly, with no precedent in this country to guide one, the influence of

Captivating Beryl Mason, who will introduce the series of North Thames and South Eastern commercial spots.

The smile is warm and comforting—so is the gas fire.

And nothing wrong with the figure.

commercial television is a completely unknown quantity.

But it has been estimated that, by the end of the year, some 650,000 may be receiving I.T.A. programmes and about a third of these are in the London area. It is further thought that during the first few months, adult audiences in the London area may average between 540,000 and 850,000, depending on the viewing time, but by the end of 1956, with three stations in operation, peak audiences may total 3 mill.

Initially, three stations, at London, Birmingham and Manchester, are being set up, each with an effective reception area of 40 miles. London commences operations on September 22, and Birmingham and Manchester in December and January respectively. From Monday to Friday the London network will be in the hands of Associated Rediffusion and on Saturday and Sunday the Associated Broadcasting Company is responsible.

Advertising spots are, for a while, to be films. When studio technique has been proved reliable the advertisements may become live. Other policy decisions taken by the I.T.A. are: (1) No advertisement spot may be associated with any particular show or may be given any regular time; the sponsor buys his brief advertising period within a certain segment of time when it will be shown at the discretion of the contractor; (2) six minutes advertising is the limit of any one hour, and advertisers have a final inducement to take at least a minute. This is because fifteen seconds cost 45% and thirty seconds 70% of a full minute.

So far, we understand, none of the larger gas appliance manufacturers has taken time on commercial T.V.

Gas-from-Oil Agreement Signed

An agreement has been signed between the British Petroleum Company, Ltd., and the South Eastern Gas Board for the production of town gas from oil in a plant to be erected by the Board at the Company's Kent oil refinery, Isle of Grain.

The British Petroleum Company are granting a long lease of a site which will be sufficient for the construction of oil gasification plant up to a daily capacity of 80 mill. cu.ft. If the plant is developed to this extent it will be equal in output to the largest gas works in the area. In the first stage gas will be produced on the scale of 15 to 20 mill. cu.ft. a day, with a saving of about 300,000 tons of coal a year. The quantity of oil to be used in the first stage is estimated to be 60 to 70,000 tons a year.

Orders will be placed by the Board as soon as possible for four oil gasification units, and these should be completed in two to two-and-a-half years. Experiments have shown that the Segas plants developed by the Board can convert into gas a wide range of oil products. The agreement, which is for a period of 20 years, is intended to lead to a close working relationship with the refinery in order to use whatever oil products are available to the best advantage of both parties.

Mains will be laid from the Isle of Grain to Strood in Kent to feed the gas into a trunk main system through which gas will be distributed south of the Thames from Sittingbourne in the east as far as Guildford in the west. The new plant will be the first in the country to use oil products on a large scale as the only material for gas production. It may prove to be significant as the point of departure from the long tradition of the gas industry in relying on coal as its main raw material.

The Institution of Gas Engineers has produced Part II of the publication, 'Unusual Incidents at Gasworks and their Lessons.' This part, which is illustrated, was prepared by the Gasworks Safety Rules Committee of the Institution, from 25 actual accidents connected with all aspects of the production of gas, and underlines the lessons to be learned and refers, where appropriate, to relevant safety regulations. Copies of this publication are now available from the Secretary of the Institution of Gas Engineers, *17, Grosvenor Street, London, S.W.1*, price 2s. post free.

'Air Pollution Problems and Their Cure' is the title of a paper to be given to the London branch of the Incorporated Plant Engineers at the Royal Society of Arts on Tuesday, October 4, at 7 p.m. The author is Mr. J. B. M. Judd, F.INST.F., M.I.PLANT E., and the guest chairman will be the Rt. Hon. Alfred Robens, M.P.

ENGINEERING

Marine and WELDING EXHIBITION

THE Engineering, Marine and Welding Exhibition and Foundry Trades' Exhibition has a particular significance this year, when the export market is tightening and increased production is the king-pin on which our future prosperity appears to rest. A greater degree of automation is the eventual practice which will keep British industry to the fore and will enable it to harness its traditional craftsmanship to maximum output. However, although these arguments are logical and obvious answers to the question, we are losing sight of the first objective—up-to-date engineering equipment—surely the immediate answer and the quickest route to success. New turbines, boilers and furnaces, pumps, mechanical handling devices, pneumatic tools, welding equipment, control and test gear, and a hundred other major items have, during the last few years, been rapidly improved and developed. They are the lifeblood with which industry must be injected now. The need to use raw materials and fuel to the best advantage and to utilize more power resources effectively can be met through the ingenuity of the craftsmanship of our engineering equipment manufacturers. This 1955 exhibition, held at Olympia, September 1 to 15, provides an outstanding opportunity to examine plant, machinery and capital equipment of the latest design, to see the products of over 500 manufacturers embracing no less than 1,000 product classifications and covering over a ¼ mill. sq. ft. of exhibition space. One feature of the exhibition which will immediately strike the visitor is the vastly improved standard of display and stand design.

This emphasis on the presentation of engineering subjects in an attractive manner is well illustrated by the Gas Council's stand, surely one of the most successful this body has produced for such an event. The main feature is a working exhibit demonstrating the use of oxy-town gas for flame hardening. The plant shown is an automatic machine for the hardening of the surface of gear teeth, and the gears being treated are a part of the production of Ruston-Bucyrus, Ltd., of Lincoln, and are used in their excavators. The machine, designed and manufactured by Peddinghaus of Gevelsberg and supplied by Surfard, Ltd., is capable of hardening gears up to 39 in. diameter and having teeth up to 9½ in. face width. Other models of similar type take gears up to 6 ft. diameter. Bevels may also be treated on the same machine. The gear to be hardened is supported on a vertical spigot passing through the bore. Water-cooled copper burners with spray quenches are arranged to dwell for an instant at the bottom of the stroke and then to pass progressively up the length of the tooth. At the end of the hardening stroke the oxygen and gas are shut off leaving a small pilot flame. The burner and quench unit then rises clear of the gear, which is automatically indexed to the next tooth. The unit finally drops quickly to the starting position where it ignites from the pilot, and the cycle is repeated. The whole operation is controlled by a master cam in the machine which ensures accurate and very consistent results. Forming part of the plant is a flow and pressure indicator for gas and oxygen which enables the operator to repeat the conditions that have produced the required results, thus saving time in setting up.

A second exhibit concerning oxy-town gas flame hardening shows the result of an experiment which was carried out by the German Railways at Darmstadt. The flanges of a pair of locomotive driving wheel tyres were flame hardened by the Peddinghaus process over half of the circumference. The locomotive was put into service and run for 35,000 kilometres (approx. 21,750 miles) over a region where the curves were most severe. At this stage the wheels were removed and the tyres sectioned to show the remarkable difference in wear.

A segment on one of these wheels is mounted showing both hardened and unhardened zones; etched sections of the tyres are also mounted. During the last few years experience has shown that the life of the flanges of the tyres is at least doubled by oxy-town gas flame hardening.

Another feature of the stand is a shell-moulding exhibit, which includes a range of metal patterns, shell moulds and cores produced in gas-fired plants, and photographs of various types of gas-heated installations in use for producing shell moulds.

To round off the purely gas exhibits, some of the wide range of processes using gas as a fuel are shown pictorially. A feature of this part of the stand is a large sectional photograph of the Napier Eland gas turbine for the jet-propelled Fairey 'Rotodyne' helicopter.

A new automatic coke-fired boiler, suitable for heating factories, office blocks and other large buildings, is shown on the stand. This boiler has automatic feed and de-ashing equipment, and will maintain absolutely constant temperatures. Under normal conditions, tests have shown that it operates at efficiencies in excess of 80%.

Of the 500 trade stands at the exhibition we have selected for review those manufacturers whose exhibits are likely to be of interest to the gas industry or who are well known in the gas field.

The **Accurate Recording Instrument Company,** show a range of indicating recording and controlling instruments for most pressures and temperatures, from vacuum up to high pressure, or from minus 240°F. up to 1,000°F. Among the exhibits noted were dial pressure gauges, 2 in. diameter up to 8 in., and dial thermometers such as distant-reading, rigid stem, vapour pressure, liquid-expansion,

A general view of the Gas Council stand.

mercury-in-steel, ranging from minus 240° F. up to 1,000° F. Pressure switches, thermostats, temperature controllers, and pressure recorders of various types are also shown.

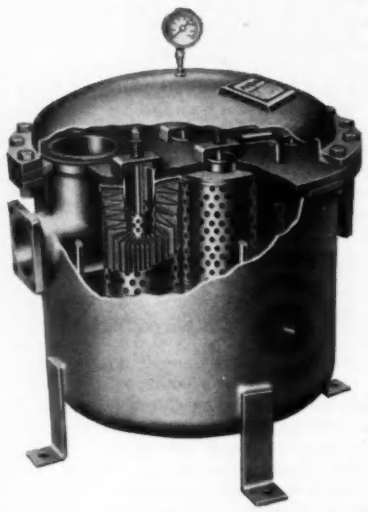
W. H. Allen, Sons, & Co., Ltd., feature a wide range of Allen power plant, pumping machinery and electrical equipment, comprising steam turbines, gas turbines, diesel engines, steam engines, pumps, gearing, alternators, D.C. generators, motors and control gear for marine, industrial and essential services. In general, however, exhibits are marine in character and description is unnecessary in these columns. However, Allen control gear is represented by an automatic contactor-type starter which will control a 200/150 h.p., 230 volt Allen D.C. motor driving an Allen high-lift pump, running at a speed of 1,850/1,550 r.p.m. The starter is fitted with single-pole contactors, overload releases and main double-pole isolating switches, and is also provided with a hand-operated shunt regulator to enable speed variation to be obtained. The starter is enclosed in sheet-steel floor-mounted housing, with an illuminated moving-coil ammeter on the top. Examples of the wide applications of Allen products are represented in the extensive display of photographs, which illustrate many installations of power generating plant, pumping machinery and electrical equipment, including their use in gasworks.

The **Audley Engineering Co., Ltd.,** enjoy a wide reputation as specialists in the manufacture of lubricated taper plug valves for use in the gas, petroleum, chemical, and general engineering industries, and a widely varied selection of 'Audco' valves is on display on the Company's stand. A number of interesting demonstrations have been arranged. As plants grow in complexity, remote control of valves is becoming increasingly important, and on the stand the application of remote control to valves is demonstrated in five individual ways. That of the photo-electrical cell is of particular interest; the removal of a catalogue from a slot ensures the operation of the valve, and in addition there is foot, electric and manual control.

Valve lubrication is of special importance, and one demonstration shows the effect of 'Lubecoat' treatment of the valve surfaces in conjunction with a lubricant having film strength which will not break down under high pressures. This process makes the valve surfaces more capable of retaining lubricant and has, of itself, a very low coefficient of friction so that the operational effort of a valve—whether lubricated or even when dry—is greatly reduced. One valve treated in this way is operating continuously throughout the whole of the exhibition. Other valves, so arranged as to have equal thrust on the taper, demonstate the effect on turning effort which the process achieves. Corrosion resistance to chemical attack is also increased.

The lubrication of valves with high pressure guns is demonstrated, and typical guns are available. The 'Audco' valves on display include sizes from ½ in. to 18 in. for pressures from extreme vacuum to 5,000 lb. per sq. in.; there are also a number of gauge glass fittings.

The **Automotive Products Co., Ltd.,** exhibit a typical working control cabinet operating various mechanisms by power-hydraulic or manual-hydraulic means. Systems such as this are to be found in generating stations, water filtration plants and gas plants all over the world. Examples of hydraulic cylinders, control valves, and relief valves, pumps, motors and other hydraulic and electro-hydraulic units are also displayed. Many of these are sectioned to show the construction and high finish of all moving parts in Lockheed equipment. Also exhibited are the well-known Borg and Beck clutches for industrial purposes, Rockford clutches and power take-offs, 'Purolator' metal edge oil and fuel filters for all industrial applications and a range of Lockheed-Avery self-sealing couplings and hoses.



A percolator for the bulk filtration of liquids such as fuel oils, exhibited by the Automotive Products Co., Ltd. Rated capacity is up to 200 gal. per minute.

Babcock & Wilcox, Ltd., show for the first time the 'Steambloc' automatic, oil-fired packaged boiler, and a marine exhibit, but gas engineers will be most interested in a boiler cleaning exhibit. The importance of clean boilers for efficient operation can hardly be over-emphasized. A large display is devoted to this question and includes a new method of soot-blower operation. The Babcock 'Unidirectional' retractable soot-blower, featured for the first time at the last Engineering and Marine Exhibition, is now available for pneumatic operation (in association with James Gordon, Ltd., manufacturers of 'Hagan' control gear). Two other types of soot-blowers are shown. First is the Babcock-Diamond unit, a small and simple hand-operated blower which has a long record of service for marine and small land-type water-tube boilers. By contrast, a large rack-type soot-blower is shown. This is intended for high-temperature zones where a retractable unit is essential and the travel required is very large (up to 25 ft.). This particular unit is shown in operation with pneumatic mechanism.

A model display shows the operation of the Babcock shot-cleaning system, which is an effective means of cleaning boiler horizontal tube surfaces (*e.g.*, air heaters and economizers) where the flue-gas temperature does not exceed the ash-fusion temperature. It is claimed that operational costs are less than 10% of those for an equivalent soot-blower installation, and operation involves no loss of condensate. Small, irregularly-shaped metal shot is cascaded evenly from a distributor above the tube banks through which it is dispersed by gravity and velocity of the furnace gases, thus dislodging the deposits in the early stage of their formation. The shot and deposit fall towards an inclined-screen separator where a controlled current of air returns the heavy deposit to the gas stream, while allowing the shot to fall into a collector bin, from which it is returned to the distributor either pneumatically or by a mechanical conveyor.

Spreader stoker firing by means of the Babcock-Detroit stoker is illustrated by a display showing samples of various types of poor-grade fuel from different parts of the world, all of which are being successfully burned in spreader installations.

The **British Rototherm Co., Ltd.,** exhibit a range of dial thermometers, recorders and controllers of the following types. Bi-metal actuation instruments include Rototherms with a wide variety of dial ranges, presentations, stem lengths and diameters for industrial and laboratory purposes. Max./min. indicating and control/alarm thermometers are included and there are special designs for diesel engines, petroleum, chemical and most industrial applications. Mercury-in-steel thermometers are of both distant reading and rigid stem models with 4 in., 6 in., 8 in. and 10 in. dials, wall or panel mounting, in modern styled indicator cases. Available designs for special applications in industry include diesel engine exhaust gas thermometers with anti-vibration head, and max./min. and control/alarm thermometers. Mercury-in-steel temperature recorders are available in single and dual pen types for wall or panel mounting. Wet and dry bulb recorders, portable recorders, and the 'Talligraph' process batch recorder are shown. A wide range of vapour pressure thermometers for industrial and other purposes in 2½ in. to 8 in. dial sizes is available in distant reading and rigid stem models. Pressure recorders and pressure gauges, to match the mercury-in-steel and vapour pressure thermometers are another exhibit.

British Steam Specialities, Ltd., show the 'Velan' steam trap range, recently introduced from North America, which incorporates many unusual features. Also of interest are the 'Vee-Reg' regulating stop valves in bronze and steel, screwed and flanged, fitted with a unique form of stainless steel disc and seat, suit-

A Broom and Wade DC115 air compressor, receiver mounted.

able for use on saturated steam, high pressure superheated steam, oil, air, water and high pressure hot water.

Other exhibits are so numerous that they had best be reported in list form: Gunmetal flanged 'Globe' valves with outside screw, cast iron 'Globe' valves, flanged in all-iron or gunmetal, gunmetal and cast iron equilibrium float valves, reducing valves for steam, air and water, wrought iron welding fittings, a full range of 'Bourdon' pressure gauges of all types, 'Boss' joint compounds, and a comprehensive selection of appliances for use on pipelines.

The British Thomson-Houston Co., Ltd., show a 230-kVA engine-driven alternator set, consisting of a Davey, Paxman 8 RPH diesel-engine with a B.T.H. 184-kW, 415-volt, 50-cycle alternator, flange-mounted and overhung from the prime mover. Another engine-driven alternator set (shown as a working exhibit) is a 6.25 kW 'Stavolt' alternator. The machine is self-excited and has such an inherently-close voltage regulation characteristic that no external voltage regulator is necessary. The 'Stavolt' was developed primarily to meet the requirements of a simple low-cost A.C. generating plant for providing electric light and power in isolated places where no electrictiy supply is available. Various outputs are available up to 550 volts, 50 cycles, either single or three-phase.

Among the representative electric motors, from fractional horsepower sizes upwards, are several machines in sections running under their own power. Various items of electric control gear are exhibited as well as 'Contector' equipment—a new development for automatic protection against 'single-phasing' of three-phase motors and the dangers arising from a breakage of overhead travelling-crane supply wires.

In addition to 'Clearcall' industrial communication equipment and the B.T.H. 451 16 mm. sound-film projector, there are demonstrations of photo-electric equipment (including flameproof types) and a new welding control cubicle using Dekatron tubes for timing. The resistance welder equipment shown working will control either a resistance spot-welding or seam-welding machine and can handle up to 2,400 kVA for short periods.

The **J. Brockhouse & Co., Ltd.**, stand shows exhibits representative of the products of the various firms in the Brockhouse organization. The above-named Company contributes drop forgings and pressings, Thomas Chatwin & Company show the 'Polygon' tool box and engineers' small tools, Kaye Alloy Castings, Ltd., show pressure and gravity die castings, the Warwick Rim & Sectioning Co., Ltd., show cold rolled section, Brockhouse Engineering (Southport), Ltd., have marine exhibits, while R. J. Hunt & Son, Ltd., contribute castings for the automobile and engineering trades.

Broom and Wade, Ltd., exhibit portable and stationary air compressors and pneumatic tools covering the requirements of engineers and foundrymen. Among these are examples of the new, lightweight, DCL compressor range and a new air-operated hand drill, type BWD120, weighing 7½ lb., which is suitable for rotating drills or non-rotating chisels.

A special exhibit is the new 'Broomwade' portable rotary air compressor, delivering 600 cu.ft. of free air per minute at 100 lb. per sq. in. pressure, direct coupled through a gear type coupling to a 180 B.H.P. C6.SFL Rolls-Royce super-charged diesel engine running at 1,650 r.p.m. This exhibit may be seen running outside gate K, near the 'Broomwade' stand.

Cathodic Corrosion Control, Ltd., offer a corrosion prevention service to industry. There are two main methods of application, one by means of an externally applied voltage and the other by the use of sacrificial anodes of a metal having a high electro-chemical voltage to iron. Where possible, the power-fed system is preferred because the ultimate requirement is a source of electric power which is far more cheaply obtainable from the mains than from an electro-chemical source. There are, however, many cases where, owing to such circumstances as non-availability of mains supply or peculiarities in the physical layout of the structure involved, the use of sacrificial anodes is advantageous.

The **Comet Pump & Engineering Co., Ltd.**, show a fascinating working model of a pump handling cotton-waste, rags, old boots, meat skewers and various oddments—in other words, what is normally considered to be 'absolutely unpumpable' material. Also shown is a pump extruding solid grease through nozzles, and a 'Go-Devil' model pump, sucking cold liquorice, solid rubber or the like and extruding through fine gauze and drilled steel plate. This model is driven by two synchronized and geared motors, one driving each end of the spindle. Metering pumps in operation are included in the exhibit.

The **Consolidated Pneumatic Tool Co., Ltd.**, show a complete range of pneumatic and electrical portable power tools with examples of portable and stationary air compressors. Other types of equipment include pneumatic hoists and rams, Duff Norton jacks, pneumatic pumps and power-operated saws. Many tools and processes are demonstrated for the benefit of visitors.

On the **Crane, Ltd.**, stand, valves for medium high pressures and temperatures are the principal exhibit. Cast steel valves for up to 600 lb. pressure and up to 1,200°F. with a variety of trims, including bronze, nickel alloy, 'Exelloy,' hardened stainless steel and molybdenum alloy, are shown, as well as bronze valves for 300 lb.-steam working pressures and cast iron valves for water working pressures up to 200 lb. Malleable iron pipe fittings and unions up to 300 lb. steam working pressure and steam traps are also representative exhibits of the Company's manufactures.

Davey, Paxman & Co., Ltd., have a stand so large and containing so many exhibits that a detailed description would overrun our space. Acordingly we list below most of the range of turbines and engines which constitute this remarkable display. An industrial gas turbine with covers removed, showing compressor and turbines, 1,260 b.h.p.; 1- and 2-cylinder industrial diesel engines for portable mobile and stationary duties, 4-13 b.h.p.; a sectional 2YB diesel engine, 2-, 3-, 4- and 6-cylinder industrial diesel engines for portable mobile and stationary duties, 16-72 b.h.p.; a sectional 4YC diesel engine; a 1-cylinder horizontal diesel engine, 21 b.h.p.; a 4-cylinder Vee-form diesel engine with torque convertor, 160 b.h.p.; a 6-cylinder flat engine for rail traction duties, 312 b.h.p.; and a 12-cylinder Vee-form gas engine for oilwell drilling, 400 s.h.p.

Saml. Denison & Son, Ltd., show a self-indicating universal testing machine of 50 tons maximum capacity and having sub-capacities to be used when testing

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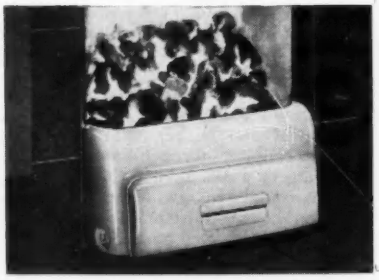

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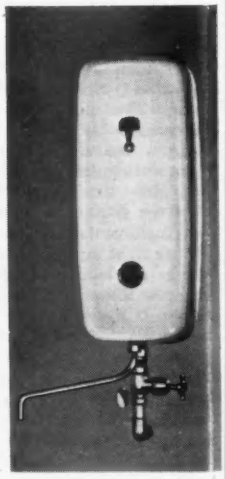

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smaller specimens. This machine is fitted with a patent mechanical extensometer and autographic load/extension recorder and a load pacing device. This has a wide range of speeds and is necessary where it is desired to load the specimen at a pre-determined and constant rate. Also shown is a compression testing machine for concrete cubes, cylinders, bricks, etc. This is available with capacities from 100 tons to 300 tons. The load on the specimen is applied hydraulically by means of a motor-driven pump.

The **Dunlop Rubber Co., Ltd.** (General Rubber Goods Division) have an impressive display of rubber products for engineering, general industrial and marine applications including oil suction and discharge hose, sand and gravel hose, hydraulic hose, together with a general range of other applicable hoses, bearings, mechanical rubbers and mouldings, expansion joints, silicone rubber products for flexibility at extreme temperatures and P.T.F.E. fabrications. Also on show are vee-belts, transmission and conveyor belting, flexible pipes and a range of 'Fortiflex' rubber resin containers for general industrial use.

Elcontrol Ltd., display examples of a wide range of industrial electronic controls, liquid level controls (including a working model showing a pump being controlled to give automatic filling of a tank), a completely new range of photoswitches, light sources and separate viewing heads, indicating the adaptability of the Elcontrol design of units to a variety of industrial applications, and flame failure or flame monitoring equipment, making use of the new infra-red cells now becoming available. A demonstration gas burner set-up, complete with spark ignition, solenoid control valves and a fully automatic programming unit is on view.

The **Electric Construction Co., Ltd.,** show a motor alternator set comprising a self-regulating, self-excited alternator coupled to a squirrel-cage motor to British Standard dimensions. The set is mounted on a combination bedplate and complete with the necessary control gear. The motor control gear is of the automatic contactor type and the cubicle for the alternator includes the necessary excitation and regulating equipment. This set is arranged for demonstration and is supported by a series of enlarged photographs of the Company's products comprising rotating machines, switch and control gear, transformers and rectifiers.

Film Cooling Towers (1925), Ltd., have as their main exhibit a working model of an All-Film Flow induced draught cooling tower. The equipment is fitted with glass sides to allow fullest observation of the splashless irrigation system and the Film Flow packing. Provision is made for allowing examination of irrigation and packing within the tower, and clearly indicates the free passage of the cooling air through the tower packing. A fan is provided at the top of the tower to demonstrate the absence of 'carry-over' without the necessity of fitting power consuming drift eliminators. Also shown is a scale model of a reinforced natural draught cooling tower.

The **Fluidrive Engineering Co., Ltd.,** show new developments covering diesel rail traction, power station plant and marine engineering. A size 29 two-speed dual Fluidrive to work with a 500 h.p. constant horsepower supercharge diesel engine in a heavy duty shunting locomotive is on view for the first time. For speed control of a 4,000 r.p.m. boiler feed pump, a size 22¼ ST.4g fluid coupling in combination with a David Brown speed increasing gear is shown. The unit is designed to operate with a 2,400 h.p. 3,000 r.p.m. squirrel cage motor. The stand also includes models of a representative range of Vulcan-Sinclair fluid couplings.

Fry's Metal Foundries, Ltd., show the wide range of solders and fluxes now used in industry, and in addition to the normal soft solders in the conventional size of stocks, strips and ingots, the Company show specialized forms in which solder is so often used nowadays. These include rings, washers, tapes, and solid and cored wire. A feature of the exhibit is the continuous demonstration of sweat soldering and tinning with 'Fryolux' solder paint. This demonstration illustrates the simplicity and economy of a soldering technique which is suitable for mass production or for small individual jobs.

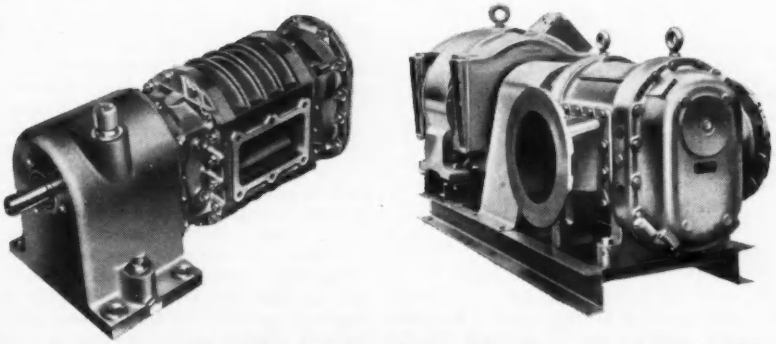
Sir George Godfrey & Partners (Industrial), Ltd., exhibit representative models from their range of industrial blowers, vacuum pumps, gas boosters and engine superchargers. All machines in this group are of the Roots positive displacement type. The industrial blowers are especially suitable for duties where oil-free air is required. They are widely used in the chemical industry for agitation of fluids, in sewage disposal plants, and for ventilation to tunnel workings. Also exhibited are a diaphragm pump, a compact unit capable of delivering from 1.5 cu.ft. per min., at 32 lb. per sq. in., a range of pressure relief valves, and a new oil engine turbo pressure charger.

Hopkinsons, Ltd., exhibits consist principally of boiler mountings, valves and associated equipment for both land and marine installations, and include a range of standard valves for pressures up to 2,000 lb. per sq. in. (steam). For land installations, a 9-in. Hopkinson-Ferranti motorized stop valve and control cubicle, 6-in. parallel-slide valve, a group of pressure gauges, water gauges and water level indicators including remote water level television system, numerous forged steel valves and small bronze valves are shown. The exhibits are supplemented by a set of small scale replicas of the firm's products, sectioned to demonstrate the working principles.

Hilmor, Ltd., are exhibiting a comprehensive range of hand-operated, hydraulic and motorized tube bending machinery. The range includes portable machines for use of the plumber, electrical contractor and gas fitter, general purpose machines for the allied engineering trades, and hand- and power-operated mandrel type benders. Special prominence is given to the mandrel type machines designed to produce completely full bore bends on extra short radii, cold and unfilled. Several new machines are being shown for the first time at this exhibition and experienced operators are in attendance to give advice on tube bending matters.

Howden, James & Co., Ltd., have as their principal exhibit this year the Howden positive displacement rotary compressor which is a development of the Lysholm compressor and is manufactured by the Company in a wide range of sizes. A typical compressor is shown in section with the rotors in motion. Models of a smaller size are displayed with varying types of drives. In addition, photographs and diagrams of some of the company's other products are shown, including mechanical draught fans for heavy duties, mine ventilating fans, sinter fans, blowers; Howden-Ljungstrom rotary regenerative air preheaters; dust extraction plant including Howden Centicell and Multi-Vortex collectors; and auxiliary steam engines and turbines.

Keelavite Rotary Pumps & Motors, Ltd., show oil hydraulic pump/motor units, pressure, flow and directional control valves, double acting cylinders and various associated equipment used in oil hydraulic power transmissions. On view for the first time are the new 1-in., 1½-in. and 2-in. universal valves. Each basic valve may be assembled in several



Two gas boosters, the K-200 (left) and the P-400 (right), shown by Sir George Godfrey & Partners, Ltd.

different ways to perform a wide range of hydraulic control functions. A working exhibit demonstrates synchronized reel off and wind up drives and a hydraulic tensioning device as used on strip metal and paper handling machinery.

Keith Blackman, Ltd., display for the first time a 'Keno' hydro rotor industrial wet washer for removing finely divided dust particles from air streams, and three examples of the Keith Blackman range of 'Tornado' P.V.C. fume removal fans. The latter are representative of two distinct types: (a) Series I, moulded fans, direct driven by K.B. made, totally enclosed motors and available in three sizes (6 in., 12 in., and 18 in. diameter impellers respectively), and (b) Series II, fabricated fans with indirect pulley drive. These are an equivalent range to the well-established Keith fan type and incorporate a 16-blade, forward curved multivane impeller (size range with impeller diameters from 15 in. to 42 in.).

Series I and II fans are a new development, shown for the first time.

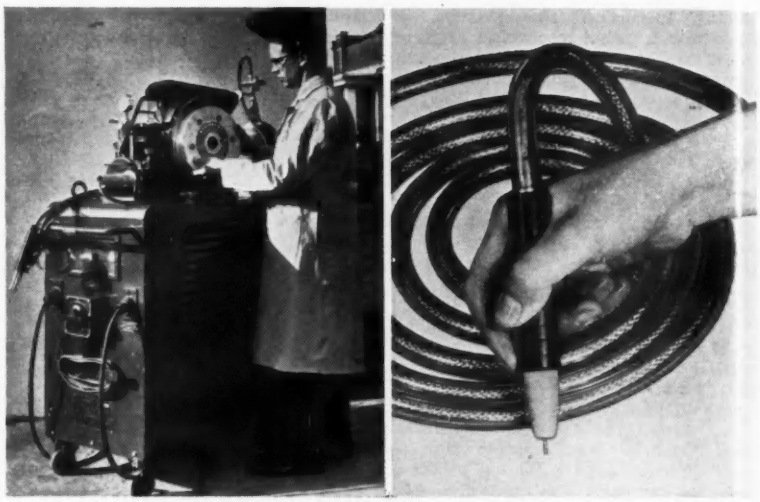
Another exhibit is a 9 in. diameter type EF. 2 Extravent window fan for exhausting vitiated air and recirculating fresh air in offices, restaurants, etc. This unit displaces 18,500 cu.ft. of air per hour with electric consumption of only 35 watts.

The **Lafarge Aluminous Cement Co., Ltd.,** stand has been designed to show the principal advantages of using Ciment Fondu and to illustrate the fact that one cement can be used for many different applications, including making refractory concrete, corrosion resistant concrete, and rapid-hardening concrete.

In this exhibit the emphasis has been placed on refractory concrete—a mixture of Ciment Fondu and crushed refractory aggregate. This material has proved to be a most adaptable medium-temperature refractory, and many illustrations of its versatility are provided. Illustrations also show how the corrosion-resistant and rapid-hardening properties of Ciment Fondu are of value to industry.

Le Bas Tube Co., Ltd., exhibits consist of examples of GF malleable iron tube fittings for use on gas, water, steam, air, and oil pipelines. GF malleable tube fittings are made from British Whiteheart iron, specially heat treated to ensure complete malleability, are free from porosity defects, and are made in a large variety of patterns and sizes from ¼ in. to 4 in. inclusive. Also shown are a few examples of jacketted pipes, expansion loops for high and low pressure steam installations, and coils for refrigeration purposes. The company is again exhibiting the GA2 and GA4 hand-operated screwing machines, the former having a screwing range from ⅜ in. to 2 in. inclusive, and the latter a screwing range from 1 in. to 4 in. inclusive.

The Northern Manufacturing Co., Ltd., exhibit a wide variety of products, among them fan-cooled worm reduction gear units; spur, bevel, spiral bevel, single and double helical enclosed units and worm gearings; non-metallic pinions; flexible and rigid couplings of all types; a range of geared motors; a range of small universal worm gears; shaft-mounted gear units; and enclosed units for special applications.



Left: New 'Argonaut' welding equipment, type 21E, shown by the British Oxygen Co., Ltd. Right: the company's 'Argonarc' pencil torch.

Ransomes, Sims & Jefferies, Ltd., show three of their well-known battery-operated 'Forklift' trucks: The 'Forklift' 10 with a capacity of 10 cwt. at 15 in. load centres, and fitted with patented automatic load stabilizers; the 'Forklift' 2,000 with a capacity of 2,000 lb. at 20 in. load centres; and the 'Forklift' 40, capacity 2 tons at 18 in. load centres, with a 10 ft. lift and a lowered height of 7 ft. 4½ in. Also shown is a T.4 tractor, battery powered, with a hauling capacity of 7½ to 10 tons, mounted on pneumatic tyres, a TE tractor, hauling capacity 2 tons, and an ENU.8 elevating platform truck.

The British Oxygen Co., Ltd., has an exhibit covering a range of 'Argon' welding and gas welding and cutting equipment suited to applications for the majority of the metalworking industry. Entirely new 'Argonaut' welding equipment, type 21E, is shown and demonstrated for the first time. The 'Argonaut' 21E is for welding heavier sections of light metal, bronze, stainless steel and mild steel, and is a development of the existing 'Argonaut' 3E equipment, particularly well suited to the latest development of welding heavy carbon steels by the inert gas shielded method which gives high quality welds at much greater speed. Other 'Argonarc' welding equipment shown includes the spot welding process and five hand welding torches which provide a range suitable for most applications. Two of the hand welding torches are of an entirely new design and are being shown for the first time. These are intended for welding in restricted locations and are known as the pencil and swivel head types.

The range of the company's gas welding and cutting blowpipes covers types suited for all current applications, and all of these will be shown and demonstrated. Included in this range are blowpipes made for combined welding and cutting, light welding, lead welding and soldering and brazing, and employing gas mixtures of oxy-acetylene, acetylene/air and air/hydrogen. The 'Cutogen' series and cutting blowpipes included types capable of cutting mild steel up to a thickness of 20 in. and cast iron up to 12 in. thick. The range of the company's cutting machines has been widened and now extends from the small portable 'Bantam' to large profiling machines.

The Rawlplug Co., Ltd., gives demonstrations of the uses of Rawlbolts. These metal expansion bolts are for heavy duty fixing jobs. Side by side with the development of Rawlplug fixing devices, there has also grown a wide range of tools for making holes in masonry. There are now Rawlplug tools for manual, electric and air operation in a range of sizes from ¼ in. to 2¼ in. diameter and up to 24 in. long for penetrating thick walls.

The introduction of Durium tipped drills has made light work of masonry drilling. Strongly reinforced Durium drills are also made for 'Kango' hammers for drilling holes in concrete. Percussion methods are advisable for breaking down the aggregate in this material. For drilling holes in very hard materials such as granite, blue bricks, concrete, etc., percussion drilling gives the best results. A normal drill can make only a few holes before needing resharpening, but the Durium hammer drill gives a greater number of holes when used with care. The Rawlplug drill hammer is an attachment for converting the rotary motion of an electric drill into a powerful hammer, each turn of the chuck producing a blow.

Reavell & Co., Ltd., show a selection of compressors and exhausters for air and gases to illustrate the company's standard types, including a vertical double acting two-stage compressor of 1,000 cu.ft. per minute capacity, and fo

sizes of single acting single-stage compressors for pressures up to 100 lb. per sq. in. and capacities up to 155 cu.ft. per minute. Two-stage compressors for 300 and 400 cu.ft. per minute, and examples of compressors for 150, 450, 600 and 1,000 lb. per sq. in., are also exhibited, and there is a four-stage compressor for pressures up to 300 atmospheres and a special type of compressor for dealing with helium and other rare gases. There are also three types of rotary compressors and three types of rotary air engines for starting internal combustion engines.

Siebe Gorman & Co., Ltd., devote most of their attention to marine safety clothing, but other exhibits include a range of the company's industrial protective equipment. Various types of breathing apparatus are shown, both of self-contained and other types. Breathing apparatus of the air-hose type is also on view, and protective clothing, gloves, and goggles, are shown.

Stewarts and Lloyds, Ltd., with associated and subsidiary companies, are exhibiting a selected range of their products on a double-decker stand. The principal display is devoted to boiler tubes, both seamless and electric resistance weld, and manipulated pipework for high pressures and temperatures. Among other of the company's products, either on show or illustrated by photographs, are steel castings, a wide range of joints and couplings (including Victaulic joints and Viking Johnson couplings), protective linings and coverings, including glass tissue wrapping, brass and gunmetal fittings, and steel tubes for the conveyance of steam, gas, water and oil.

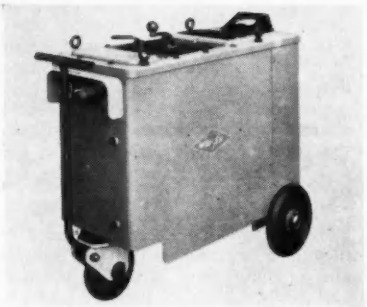
Stothert & Pitt, Ltd., also concentrate on marine exhibits, and pumps exhibited include those for fuel and lubricating oil services, and for high viscosity liquids. Outputs range from 48,000 gal. to 750 gal. per hour. The fuel oil units include a design for pumping against pressures rising to 1,000 lb. per sq. in. Demonstration units illustrate the ability of the screw pump to create and maintain a high vacuum.

Tangyes, Ltd., exhibits are many and varied and include the following: Diesel engines, various hydraulic jacks, 'Hydralite' super lightweight hydraulic jacks, various centrifugal pumps, a 'Duplex' boiler feed pump, a vertical single ram pump, hydraulic hand test pumps, and industrial heating stoves for coke, gas, or oil firing.

Murex Welding Processes, Ltd., exhibits include new electric arc welding equipments and electrodes, and demonstrate how the Murex Research Department aids industry. This theme is illustrated by a series of instructional displays which show the wide scope of the research work undertaken by the Company.

The central feature is an exhibit which demonstrates a basic point in metallurgy of steel, *i.e.*, the transformation of its atomic structure associated with a temperature of 900°C. Grouped around this central exhibit are other displays to show metallurgical and physical testing, radiography, chemical and spectrographic analysis. One of these exhibits includes a miniature machine for testing the toughness of steel.

Among the other exhibits is a comprehensive display of Murex arc welding electrodes, including the new 'Fortrex' range of hydrogen controlled electrodes. Also shown is the 'Coilex' electrode, a new double wire wound flux extruded continuous electrode for the automatic arc welding of mild steel. The rotary equipments include the new Murex 'Dynex' brush shift generator which allows infinite variation of current irrespective of voltage. This is also shown incorporated in a Murex motor generator



A Murex 450S. oil-cooled portable arc welding transformer.

set. Among the transformers are a new type 200 equipment with a re-designed front panel, a new type 450S portable transformer, and a new 350 amp. tapped type regulator for use with multi-operator sets. The latest type of Murex 300/400 amp. diesel engine-driven equipments is shown and a new 350 amp. rectifier equipment completes the display which also includes a complete range of Murex welding accessories.

Edgar Vaughan & Co., Ltd., feature their range of products for the metal working industry, including neat and soluble cutting oils, drawing compounds, lubricants, rust preventatives and hydraulic oils. Also shown are industrial cleaners (hot and cold), and 'Houghto'—a safe non-inflammable fluid for use in hydraulic systems. Qualified representatives are in attendance to advise on relevant matters.

G. & J. Weir, Ltd., have primarily marine exhibits on their stand, but among the subsidiary items are small scale models of Weir units depicting pumps, a regenerative condenser, deaerator, robot feed regulator, and a sextuple-effect evaporating plant.

The Yorkshire Copper Works, Ltd., are of course specialists in the manufacture of solid drawn (seamless) tubes in brass, copper, and such materials as 'Yorcalbro' (aluminium-brass), cupro-nickel, 'Yorcoron,' 'Yorcalnic,' 'Yorcunife' (copper-nickel-iron) and other special non-ferrous alloys. Their exhibit includes samples of these and of 'Yorcalbro' tubes and 'Yorkshire' high duty fittings for such applications as domestic engineering, steam, refrigeration and heating services, and bottled gas installations.

Fibreglass, Ltd., specialists in insulation, limit their display to marine applications.

The General Electric Co., Ltd., devote the whole of their stand to marine equipment.

John G. Stein & Co., Ltd., exhibit in the foundry section, and show a comprehensive range of refractory materials covering the requirements of all types of industrial furnaces. The range of refractory qualities include: Firebricks (30% alumina—42% alumina), silica bricks (96% silica), high alumina bricks (50% alumina and over—including Sillimanite and Mullite), basic bricks (magnesite, chrome magnesite and chrome), refractory cements, fireclays and ganister. Also on display are detailed models of metallurgical furnaces, etc., illustrating the correct type of refractory for each application.

Underground Coal Gas Production

Some important experiments are being carried out at a Ministry of Fuel and Power Research Station at Rock Farm near Bewdley which are likely to have a far-reaching effect upon the nation's fuel problems. A new technique has been employed at the station and is stated to be proving very successful. It is concerned with the underground production of gas from coal which could not be mined economically in the ordinary way. A square mile of coal in a seam 3 ft. thick is estimated to be able to supply electricity continuously at the rate of 10,000 kW for 25 years. The significance of this can be assessed when it is stated that 500 mill. tons of unmineable coal are known to exist within 600 ft. of the surface in Britain.

Plans are in hand to set up a full scale pilot plant in order to get accurate details of costs. If such arrangements mature work is likely in Derbyshire or Yorkshire. In order to extract gas from the coal, air is forced through an underground seam which has been ignited and the gas given off is collected and used to drive generating plant. Low quality gas is produced in large quantities as fuel for generating sets which could supply electricity direct into the grid. It has been found by experiment that one ton of coal burned below the surface will give 1,000 kWh or something just under 50% of the amount yielded by a ton burned in a power station. An important consideration is that there are no transport costs and that little interference is caused to the top soil. Worked out seams have not caused subsidence.

Hurseal, Ltd., are having an 'At Home' on September 21, where they will exhibit many of their products. Mr. A. C. Hazel, a member of the company, will give a short talk on 'New Heating Ideas at Home and Abroad.'

Developments in Sunderland Division

A description of the new Chester-le-Street purified coke-oven gas distribution and valve control centre, which was brought into operation in April, was given to members of the Sunderland Division Consumers' Committee when they visited the centre on August 30, by Mr. W. O. Kirkwood, General Manager of the Sunderland Division of the Northern Gas Board. Mr. Kirkwood said that the centre was now operating successfully and handling the total output of purified coke-oven gas from the Stella Gill coke ovens. Within the next few weeks an additional supply of purified gas from the new Lambton coke-oven battery would be available to augment the output of gas from the centre.

The control centre was constructed inside the shell of a building erected in 1909 as a retort house and subsequently converted into a purifier house to handle crude coke-oven gas supplied from the Stella Gill coke ovens to Chester-le-Street.

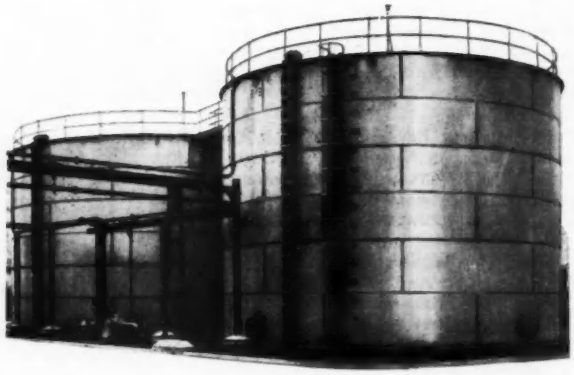
It comprised a gas manifold 24 in. dia. by 44 ft. 10 in. long with entries at each end to receive coke-oven gas. There were eight tappings along the length of the manifold varying from 6 in. dia. to 12 in. dia. to feed the offtakes. The entire output of the Stella Gill coke ovens was fed into the manifold *via* a filter unit and any additional gas requirements would be supplied through a constant outlet pressure governor on the Lambton coke-oven supply to maintain a constant pressure in the manifold irrespective of volume throughout.

Should surplus pressure be available in the manifold the Lambton governor would close down and an excess pressure governor would relieve the pressure to the Tyneside Division at a predetermined pressure condition varying from a few in. W.G. to 2 lb. per sq. in. The Chester-le-Street works was supplied from the manifold by a constant volume governor while the interlink mains to Durham, Stanley and Washington were supplied by constant pressure governors. Because of the variation in distances and sizes of the interlink mains the fundamental principle for successful operation of the centre was the maintenance of constant pressure conditions irrespective of volumes. By planning the volume requirements of the various receiving stations and the accurate operation of the constant volume governors at these stations the grid centre would be comparatively easy to operate.

The instrument panel supplied by Electroflo Meters Co., Ltd., indicated the flow and pressure in all the incoming and outgoing mains as well as indicating and recording the temperature and pressure of the gas in the manifold. Each flow indicator had an integrator to give the total volume passed. A high-low signal light and Klaxon alarm were incorporated in the manifold to give warning of irregular conditions.

Mr. W. O. Kirkwood told members of the Sunderland Division Consumers' Committee at the meeting on August 30, that during the year ended March 31, 1955, the output of gas for the division reached a total of 4,346 mill. cu.ft., an increase of 6.06% over the corresponding year. At the Sunderland unit alone the consumption was 3,151 mill. cu.ft., a rise of 7% over the previous 12 months and a record yearly output. During the year the number of gas consumers increased by 1,687 and 36.5 miles of new grid and housing estates mains were laid.

In order to reduce steam raising costs and to increase the steaming capacity of boilers at Hendon, Sunderland, to meet the increasing steam demand for high pressure gas compressing plant, the Board approved the installation of mechanical stoking plant with overhead storage to utilize low grade fuel for steam raising. 'With the introduction of this plant we anticipate an annual saving of at least £3,500 by the utilization of low grade coke breeze,' said Mr. Kirkwood. The Board had also approved the introduction of a 200,000 cu.ft. per hour fan booster at the Stanley unit to improve district pressures in outlying areas, particularly during the midday cooking load.



Photograph by courtesy of the North Thames Gas Board

Riveted Steel Tanks at Bromley-by-Bow Gasworks

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GAS CONSULTATIVE COUNCILS

Consumer Accuses Board Chairman

As a result of a letter which alleged the 'publication of lies by Mr. W. K. Hutchison, Chairman of the South Eastern Gas Board,' a South London consumer stood before the area Consultative Council on September 6 to present his case. Mr. L. F. Randall, Deputy Commercial Manager was there to answer the charges against the Board.

The consumer, Mr. A. J. Oates, of Grove Park, London, S.E.12, said in his letter to the Secretary of the Council that the Chairman of the Board 'stated two deliberate lies in his press publication that the 2d. per therm increase will cost the average consumer 5d. per week.

'Small Consumer'

'I am only a small consumer,' the letter continued. 'The wife and myself, we consume 288 therms per year—that is, 5½ therms per week—that is, 11d. per week increase.'

The average consumer was more than two in family, and even at his own rate, he said, the Board would increase its income by £3,575,000 per year. As the extra costs estimated by the Chairman were £2,500,000, there was no need to raise the price of coke as well, making an extra £1,075,000 profit.

The letter continued: 'He (the Chairman) also states that this 2d. increase is double that imposed by the Board last year. Mr. Hutchison is a liar, last year's increase was also 2d. per therm.

'I have receipts, etc., to prove above statements and will produce them any place or time convenient to you. The price of gas has now increased by nearly 200% since pre-war.'

'Twice the Average'

A reply from the South Eastern Gas Board was sent through the Consultative Council. The average yearly consumption of 288 therms was, in fact, more than twice the average annual domestic consumption in the Board's area. It was on that assessment that the average increase per consumer of 5d. a week, as the result of the recent increase in the price of gas, of 2d. per therm, was computed.

It was accepted, therefore, that in his case, at the rate of increase of 2d. per therm, the additional cost to him on the flat rate would be 11d. per week. 'Should you, however, take advantage of the Board's two-part tariff, the weekly increase would then be approximately 9d.'

Mr. Hutchison's statement to the Council, continued the reply, referred to the fact that the Board was faced with additional costs covering an increase in the price of coal, and increased wages and salaries, etc., of about £2¼ mill. in one year. The recently announced 2d. per therm increase was estimated to produce additional revenue of some £2 mill. If there had been no increase in the price of coke, the additional increase of 2d. per therm, in the price of gas would be insufficient to meet the Board's commitments.

Referring to Mr. Oates's comparison with last year's increase in the price of gas, this in fact amounted to 1d. as compared with this year's increase of 2d. per therm.

Before Mr. Oates began to speak, Mrs. H. S. Mair asked if Mr. Oates would be willing to alter the wording of his letter, substituting for 'lies' and 'liar' something like 'statements which seemed to me to be misleading.'

Mr. Oates: I am quite willing to delete these words and use the words 'terminological inexactitude.' The only point is Mr. Hutchison's statement is dead opposite to the Board's Gas Card.

Councillor D. R. Lloyd: But Mr. Hutchison is not a liar!

Mr. Oates said his first point was that Mr. Hutchison stated that this twopence increase per therm in gas was double what it was last time. The Chairman in his statement had stated that the last increase was a penny. 'The last increase,' he said, 'was twopence, not a penny. I am speaking as a slot meter two-part tariff consumer.'

Special Class

Mr. Randall replied to this point that Mr. Oates was correct in saying that as a two-part tariff consumer he was paying the last price increase on 14d. a therm which brought it to 16d. The two-part tariff consumer was a special class which existed only in the Metropolitan Division. But the Chairman in his statement obviously had dealt with the policy of the Board as it applied in the main to all its consumers. That was that the price of gas was going to increase twopence a therm. Last time the price of gas increased a penny a therm except to those 31,000 special consumers on the Metropolitan division, where the increase was 4d. This time the increase to that class of consumer was only a halfpenny.

After hearing some of the discussion between Mr. Oates and Mr. Randall, a member, Mr. R. A. Addison, interposed: 'I think it must be admitted that on the printed notification that was issued, there was certainly no mention of this fact as it applied to those 31,000 consumers. Whether that was an oversight or an intention of course we do not know, but I think it must be agreed at least on that point, Mr. Oates's statement is correct.'

Deferred

After considerable discussion by the consumer and Mr. Randall, interspersed with remarks by the Council, they both left the council room to continue the matter elsewhere and it was agreed to defer the matter until the next meeting.

Several council members vehemently protested against the matter being discussed in such detail at the meeting. They felt that the basic case for each side should have been decided beforehand.

The Chairman, Mr. A. B. Constable, said he had not realized such a mass of figures was going to be presented.

Pensioners' Concession Illegal

At a meeting of the East Midlands Gas Consultative Council in Nottingham on September 6, members were told that a previously suggested concessionary opportunity for old age pensioners to choose whether they were charged on a two or three block tariff system was not legally possible.

When the Council accepted the East Midlands Gas Board's revised tariff structure, introducing a two-block system, in August, the Chairman of the Board, Mr. Sydney Smith, said he was prepared to make the concession, that throughout the Board's area, and subject to it being tied up legally to avoid misuse, they would give old age pensioners the opportunity to choose whether they were charged on the new two-block system or the existing three-block tariff.

Last Tuesday Mr. Smith said he had made this statement in good faith and had asked for time to study its implications. He was sorry to have to advise the council that legally it was not possible. The Board, however, appreciate the reasons which prompted the request and they are willing to take such action as they may legally and properly take in order to relieve any known cases of hardship. Such action, by reason of the fact that it will not be restricted to any special class of consumer, may, in fact, better serve the purpose and intention which the council had in mind, rather than the original proposal.

Mr. F. A. Heron asked: 'How is hardship to be known to the Board? Is there to be some form of administration running on lines parallel with the Assistance Board? If the Board has some discretionary powers, the public are entitled to know of them and how they will be used.

'The situation as explained is so indecisive and intangible,' he went on, 'that I cannot see why I should accept it. If concessions are available to one, or some persons, they should be equally available to all that come within that category.'

Another member was of the opinion that concessions for cases of hardship should be a national charge on the national exchequer, not the responsibility of local boards.

Mr. G. W. Brassington said it is the job of those suffering hardship to make known their case to the Board and then, if they did not get satisfaction, to come to the council.

NEWS IN BRIEF

A gala day at Reading brought to a close the season of the Southern Gas Board sports league. Reading were the winners of the cricket league, and Aldershot won the bowls league competition. To show their superiority in the cricket section, Reading won the seven-a-side knock-out competition on gala day. The winners of an American tennis tournament were Mr. and Mrs. A. Cock, of Farnham.

A Southern Gas Board spokesman stated on September 1 that the stock position at the Reading works for the forthcoming winter was satisfactory. 'During the rail strike,' he said, 'our stocks were down to a minimum, but the Board took immediate action and coal was imported by road transport from London Docks for that period. Thus we did not suffer the serious loss which would have been entailed if we had been entirely dependent on home supplies.'

Representation for the Bosch gas igniter has been in the hands of Tekon, Ltd. The directors of that company, Mr. T. V. B. Hirst and Mr. P. Wertheimer, having registered a partnership in the name *Tekon, of 50, Baker Street, London, W.1 (WELbeck 6175)*, in which they practise as consulting engineers, are thereby precluded from engaging in commercial activities. It has therefore been agreed that representation be handed back to Bosch, Limited, of *20, Carlisle Road, The Hyde, Hendon, N.W.9 (COLindale 2211)* to whom all communications relating to the Bosch gas igniter should now be addressed.

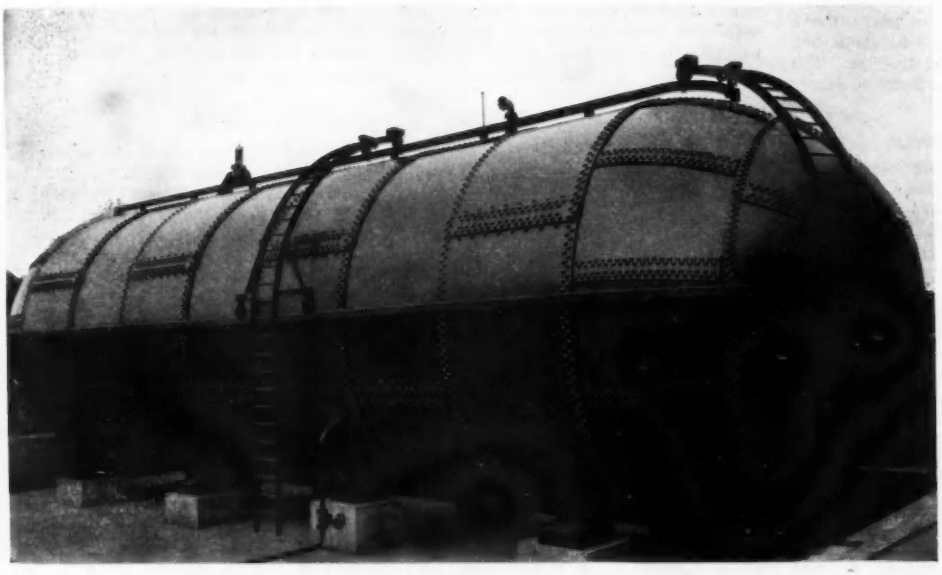
At a meeting of Sunderland Gas Consumer Committee, Mr. W. O. Kirkwood, manager of the Sunderland Division of the Northern Gas Board, stated that gas production during the year ended March 31 at 4,346,000 cu.ft. was a record. It was reported that the laying of new mains was improving pressure in many districts, and the use of mechanical stokers to utilize low-grade coal for steam-raising was expected to save £3,500 per annum.

The Federation of Civil Engineering Contractors is publishing a handbook this month which presents, for the first time in one volume, the names and addresses of its 660 members (both alphabetically and by the area sections) and all the main Federation documents. These include the Working Rule Agreement of the Civil Engineering Construction Conciliation Board for Great Britain, Holidays with Pay Agreements, I.C.E. Conditions of Contract, and the Federation Dayworks Schedules.

The Conciliation Board (of which the Federation forms the employers' side) administers a scheme for the training of contractors' plant mechanics, and the Federation and the Institution of Civil Engineers jointly administer a scheme for the practical training of young engineers. Details of both these schemes are given in the Handbook which costs 10s., including postage. Copies can be obtained from the Federation, *Romney House, Tufton Street, London, S.W.1.*

Specialists in street lighting by gas will be available to answer the questions of visitors to the Gas Council Stand (No. 17) at the exhibition held in conjunction with the annual conference of the Association of Public Lighting Engineers at Folkestone, to be held from September 13 to 16. There is a supporting display of the latest type of gas lighting units and other equipment for use in conjunction with them. Examples will also illustrate the economic advantages of modernising existing lamp standards by the addition of up-to-date lanterns.

Mr. Geoffrey Lloyd, Minister of Fuel and Power, will open the first session of the 10th congress of the International Union of Producers and Distributors of Electricity which starts in London on September 19. The congress, which is to be held at the Church House, Westminster, will discuss such subjects as thermal and hydro-electric generation, atmospheric pollution and distribution.



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16

Dublin Strike Threat

More than 130,000 families in Dublin and district will be without gas for cooking if the city's gas workers—employees of the Alliance and Dublin Consumers' Gas Co.—go on strike this week-end. The executive committee of the Workers' Union of Ireland at a meeting on Friday night accepted a recommendation from the gas workers' branch of the union to serve seven days' strike notice. The dispute has arisen over a claim for increased pay for manual workers.

Miners' Summer School

Men from all the British coalfields will be living as students in Oxford colleges this month when the National Coal board hold their ninth annual summer school from September 10 to 17. Nearly 500 students from all sectors of the industry including eighty colliery workers and under officials will attend. They will be staying in Wadham, Jesus, Pembroke, Magdalen and University Colleges.

The opening lecture on Monday, September 12 was presented by Sir Andrew Bryan, Board Member for Staff and the closing address on Friday, September 16, will be made by Dr. W. Reid, Board Member for Production. Other speakers include Dr. W. A. MacFarlane, of the National Industrial Fuel Advisory Service; Mr. Norman Fisher, Director of the Board's new Staff College; and Mr. E. F. Schumacher, the Board's Economic Adviser.

20-YEAR HEATER

The illustration shows Miss Margaret Clay, of Muswell Hill, London, with her National Gas Water Heater which she has serviced herself for over twenty trouble-free years. Sydney Flavel & Co., Ltd., of Leamington, are now producing the Flavel National Models No. 10 and No. 20 Water Heaters, which still incorporate the original principles.

Radiation Equip Rubery Owen Canteen

Radiation, Ltd., were the contractors responsible for providing cooking and kitchen equipment for the £40,000 industrial canteen to serve 700 employees of Rubery Owen (Warrington), Ltd. The single storey building is built on stilts because of the nature of the site.

The main dining hall accommodating 274 persons has cream walls and maroon woodwork. Contemporary all-over pattern curtains, with maroon and grey the basic colours, furnish the windows.

About 200 main meals and a smaller number of snack meals (sandwiches and cakes) are served each day.

The Radiation cooking equipment includes 'Chester' cooker with two two-door ovens and 11 burners and also a roasting oven which back on to the three-pan fish frying range, six-shelf steaming oven and 'Savoy' grill. Against the outside wall, there are three 30-gallon boilers, each with independent water feed. They have hinged, balanced lids. Alongside is a second 'Savoy' grill. This equipment is also covered by a hood with extractor fan to draw off free steam. Equipment mounted on the two-tier whitewood table includes a hand chipper and a Danzer tin opener.

The pastry room has a Radiation 'Grosvenor' oven with four small burners and grill (so that fillings, cream, etc., may be prepared without interfering with work in the main kitchen) and porcelain sink and drain board.

In the dish washing room is a Euk stainless steel, gas-heated three-sink washing machine.

A Radiation hot plate takes up 18 ft. of the length of the servery and the remainder is a stainless steel counter for handing over sandwiches, cakes and cups of tea. A Radiation, 15 gal., thermostatically controlled boiler supplies water for making tea and coffee.

Occupational Psychology

The achievement of satisfaction and co-operation among all those concerned in production was regarded as the most important and urgent human problem in industry by a number of companies recently approached by the National Institute of Industrial Psychology. The Institute's survey, described in the July issue of *Occupational Psychology*, was over too small a range of firms for general use, but it provides experience which may be useful in planning future research.

It is stated that more than half the companies who were approached, failed to complete the questionnaires on the relative importance or urgency of their human problems and the answers which were given by the others showed that they might have been influenced by the size of the firm or the duties of the executive who completed the form. Nevertheless, it seemed clear that questions of employers' attitudes were of great importance to many and that they thought that more should be known about the subject. Managers seemed anxious to know how to alter policy, and to know about organization and methods without friction, and they referred frequently to loyalty, sense of responsibility, resistance to change and interest in work.

The difficulties under which psychologists work in industry are examined in a paper by Dr. Alastair Heron, a member of the Medical Research Council's unit for research in occupational adaptation. He says that those connected with occupational psychology are anxious about its scientific progress and its public status. There are scientific problems which could profitably engage their attention at once, but the solution of these problems must be sought in the factories and other places where they arise. People in industry are reluctant to give facilities for this work, but increased respect for psychologists as scientists would unlock doors now closed.

Other articles in this issue are concerned with the importance of more exhaustive tests in industry for defective colour vision and with the element of timing in industrial skill. In the latter, Dr. R. Conrad points out that inquiries into road, rail and air accidents often state that there had been an error on the part of some individual who should have been in control of his part of the situation. If this meant that he had to respond to certain signals, it might happen sometimes that a group of signals would occur in such an order and within such narrow time limits that no human being could possibly respond to them all correctly. Although this failure might be called human error, there might, in fact, have been no error at all, but an accident in the pattern of the signals which made the human reaction inevitable.

Women's Gas Association in Melbourne

The National Gas Association of Australia has announced the formation of the Women's Gas Association in Melbourne, an organization on similar lines to our own Women's Gas Federation. The W.G.F. was asked to advise on the setting up of the new association, and has been in touch with the organizers during the last twenty months.

As long ago as January, 1954, a letter was received from the Gas and Fuel Corporation of Victoria, stating that they were 'interested in setting-up a women's organization along the lines of the Women's Gas Federation, which we understand is making quite a contribution to the goodwill of the gas industry in Great Britain,' and asking for various particulars.

The inaugural meeting was successfully launched in Melbourne on March 17 this year, the President being Mrs. R. S. Andrews and the Convenor, Miss Mary MacLean.

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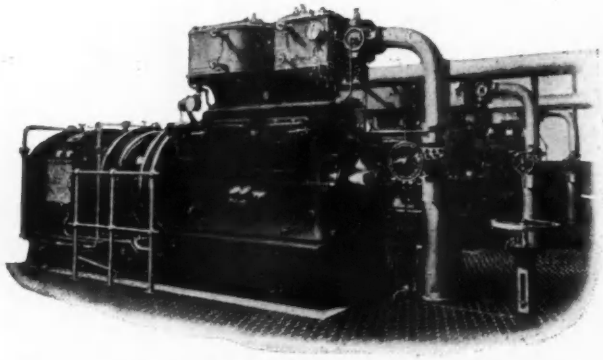

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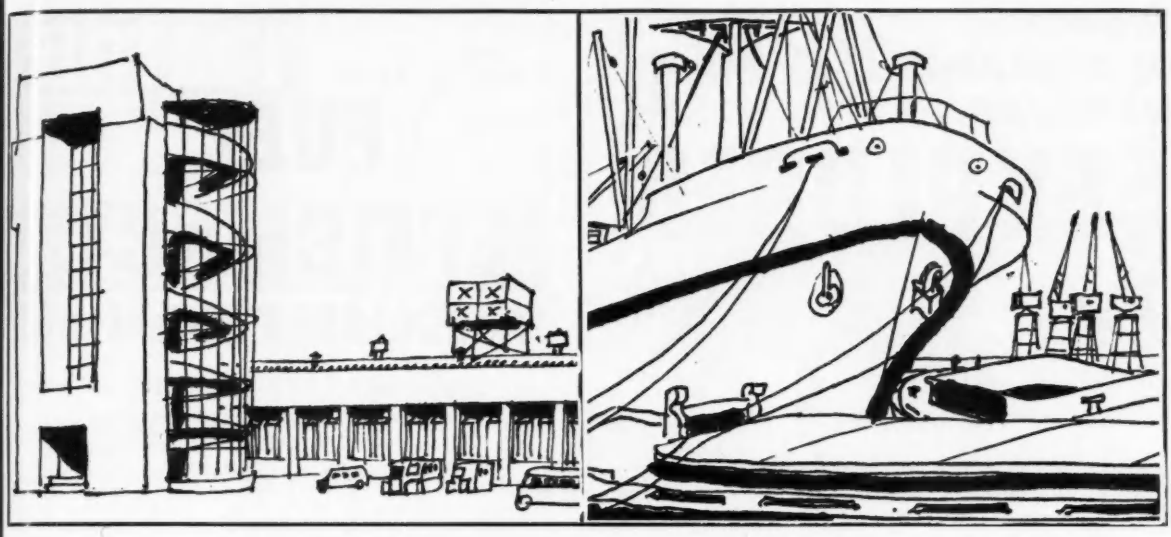

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For gas, water and waste services, in ships and shops, factories and homes, I.C.I. tube fittings, made at Fyffe Works, Dundee, have proved one of the quickest and most efficient methods of jointing light gauge copper tubing. I.C.I. manufacture a complete range of compression and capillary fittings in the following patterns:

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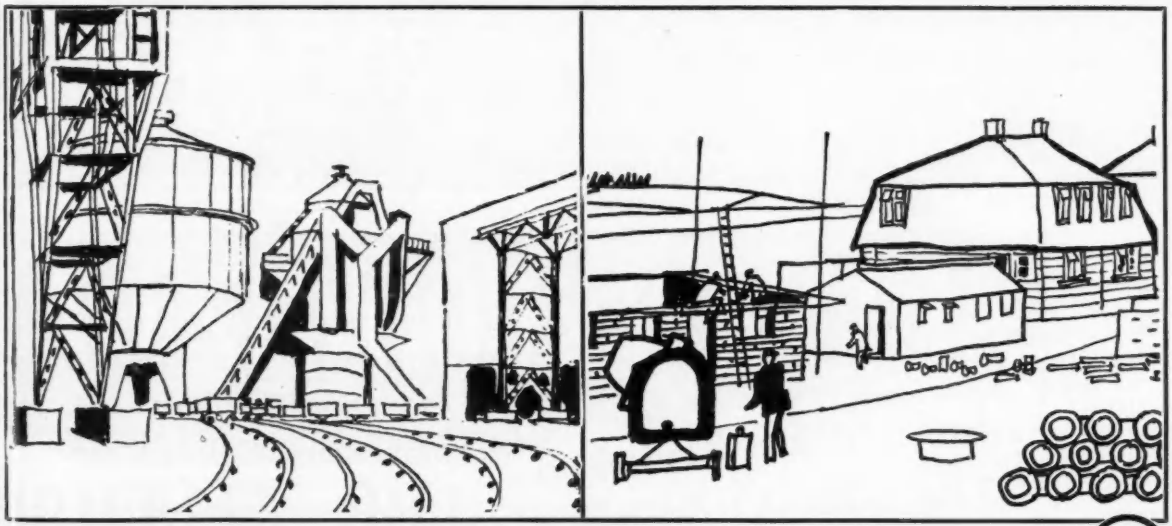

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STOURBRIDGE, ENGLAND. LTD

INSULATING BRICKS, RECUPERATOR TUBES, SPECIAL SEMI-SILICA QUALITY FOR SEGMENTAL RETORTS WITH NO EXPANSION OR CONTRACTION AT 1400° C

Manufacturers of

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OF EVERY DESCRIPTION

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COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.
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ONE OF THE FIRST AND
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10″ & 12″ New Cast Iron Flanged Pipes 9′ & 12′
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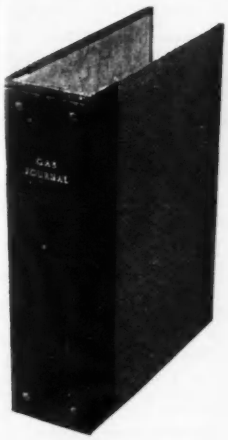

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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/– per annum; Foreign:—60/– per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/– per line (approx. 7 words)—minimum charge 10/–. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* King's Norton 3868.

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

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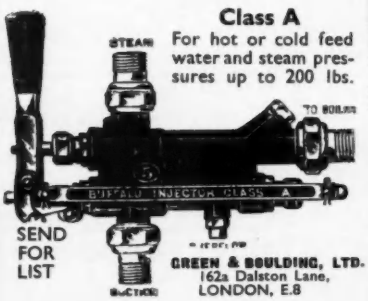
Class A

For hot or cold feed water and steam pressures up to 200 lbs.



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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SCOTTISH GAS BOARD

CENTRAL DIVISION, FIFE GROUP
ASSISTANT MANAGER—BUCKHAVEN AND LEVEN

APPLICATIONS are invited for the position of ASSISTANT MANAGER to the Buckhaven and Leven District.

Applicants should be fully experienced in the control of Vertical Retorts and Carburetted Water Gas Plants and should possess the Higher Grade Certificate in Manufacture of the I.G.E. or equivalent qualifications.

The salary will be up to Grade A.P.T. 8, Provincial "A," *i.e.*, £660 to £740 with placing according to qualifications and experience, and a house is available at a moderate rent.

The position is superannuated and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, to be submitted to the undersigned not later than Friday, October 7, 1955.

DAVID L. DICKSON,
Group Manager.

Scottish Gas Board,
Grange Road,
Dunfermline.

SCOTTISH GAS BOARD

FIFE GROUP
GROUP DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited for the position of GROUP DISTRIBUTION SUPERINTENDENT.

The position carries a salary up to Scale Grade 9, Provincial "A," *i.e.*, £700/£800 per annum with placing according to experience.

Applicants should state in their application technical qualifications, giving details of previous experience, with particular reference to the use of Towns Gas for Industrial purposes, High and Low Pressure distribution, and outlining experience in preparing and designing integration schemes.

Applications to be sent in to reach the undersigned not later than October 7, 1955, with copies of Testimonials or the names and addresses of two referees to whom reference can be made.

The position is superannuated and a medical examination will be required.

A three-apartment house at a moderate rent is available with immediate entry.

DAVID L. DICKSON,
Group Manager.

Gas Offices,
Grange Road,
Dunfermline.
September 10, 1955.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DIVISIONAL INDUSTRIAL GAS STAFF

APPLICATIONS are invited for the following posts:—

INDUSTRIAL GAS REPRESENTATIVES (two vacancies).

Candidates should have experience in industrial and commercial gas utilisation and a knowledge of the comparative costs and merits of other fuels.

Possession of the Institution of Gas Engineers, Higher Grade Certificate in Gas Engineering (Supply) or equivalent qualification would be advantageous.

The salary will be within the range of Grade A.P.T. 8 (£660-£740 per annum) of the National Salary Scales.

TRAINEES (two vacancies).

Candidates should have suitable basic training, personality and qualifications and be interested in a career on the industrial side of the Gas Industry.

The persons appointed may be expected to follow a course of training.

The salary will be within the range of Grade A.P.T. 4 (£365-£555 per annum) or Grade A.P.T. 5 (£530-£610 per annum) of the National Salary Scales, according to qualifications and experience.

These appointments will be superannuable, and the successful candidates may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DRAUGHTSMAN,
DIVISIONAL DISTRIBUTING ENGINEER'S DEPARTMENT, OLDBURY

CANDIDATES should have experience in the design of light steel structures and be capable of preparing general arrangement and detailed drawings of cast iron and mild steel pipe connections. Possession of the Higher National Certificate in Mechanical Engineering would be an advantage.

The commencing salary will be within the range of Grade A.P.T. 7 (£620-£700 per annum) of the National Salary Scales for Gas Staffs.

The appointment is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

A VACANCY exists for a Design Draughtsman in the Development Section of a Birmingham Company, manufacturing brasswork for domestic gas appliances. Staff Pension Scheme. Canteen. Applications stating age, details of experience and salary required to No. 255, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WALES GAS BOARD

RHONDDA UNDERTAKING

APPLICATIONS are invited for the post of SALESMAN in the above Undertaking.

The duties of the successful applicant will be those normally associated with the post of Salesman in the Gas Industry, such as interviewing consumers at their homes, attendance at exhibitions, etc.

The post is graded as Grade B (Provincial A), i.e., £435-£515 per annum.

The commencing salary will be fixed in accordance with age and experience.

Previous experience in the Gas Industry is desirable and ability to drive a vehicle will be an advantage.

The successful applicant will be required to pass a medical examination and to subscribe to the Board's Superannuation Scheme.

Applications, stating age, education, qualifications and experience together with the names of two referees should be sent to the undersigned not later than 14 days after the appearance of this advertisement.

ELWYN JONES,
Engineer and Manager,

Rhondda Gas Undertaking,
Gas Offices,
Pentre,
Rhondda.

WALES GAS BOARD

SOUTH WALES GAS GRID
GRID MANAGER

APPLICATIONS are invited for the appointment of GRID MANAGER for the South Wales Gas Grid.

This Grid has been planned to collect gas from coke oven plants and the Board's manufacturing stations. Gas is at present being supplied through the grid to 38 receiving undertakings, and further extensions are in progress and are contemplated.

The duties of the successful candidate will include the responsibility for:—

(1) The co-ordination of supplies from the various coke oven plants and from the Board's manufacturing stations into the grid.

(2) The allocation of the gas from the grid to meet the demands of the receiving undertakings.

(3) The maintenance of the grid mains, governors, meters and control equipment.

(4) The operation of future extensions of the grid.

Applicants should have considerable knowledge of the economics of gas production and of distribution and, in addition, should have had extensive experience of the design, laying and maintenance of large scale high pressure distribution systems.

The commencing salary offered will be commensurate with the qualifications and experience of the successful applicant and will be not less than £1,500 per annum, and the post is pensionable.

The successful applicant will be required to pass a medical examination.

Applications, stating age and giving full particulars of education, training, qualifications and experience, together with the names of two referees, should be received by the undersigned not later than September 24, 1955.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
VACANCY FOR FIRST CLASS GASFITTER—COALVILLE (LEICESTER)

THERE is a vacancy for a FIRST CLASS GAS FITTER in the Coalville (Provincial A) District. An excellent newly-built house is available for the successful applicant on reasonable terms under a standard Service Occupation Agreement.

Applications are invited and these, stating age and giving details of qualifications and experience, together with the name of a referee, should be addressed to reach the undersigned not later than September 30, 1955.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.
September 7, 1955.

PATENTS

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent) Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

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FOR SALE: NEW GAS-FIRED BOILER by Hartley & Sugden. 160 lbs./hour at 80 lbs. p.s.i. complete with chimney, spare burner and controls. Original purchase price was £419. Our price £200. W. H. COLLINGBOURNE & CO., LTD., 148 Stratford Road, Birmingham, 28. Phone: Shirley 3303.

BOILERS FOR DISPOSAL

Economic.

Hudson Patent Economic Boiler 18 ft. long × 8 ft. 6 in. dia. with two side banks of tubes each 24 ft. long × 4 ft. 8 in. dia. Working pressure 150 lb. per sq. inch. Evaporation 14,000 lb. per hour with automatic stokers.

Paxman, horizontal economic multitubular Boiler 14 ft. long × 8 ft. 7 in. dia. × 160 lb. working pressure. Evaporation approx. 7,990 lb. per hour from feed at 212°F.

Lancashire.

One—24 ft. long × 9 ft. dia. × 190 lb. working pressure. Hand fired.

One—21 ft. long × 7 ft. 6 in. dia. × 100 lb. working pressure. Hand fired.

Vertical.

Blake vertical multitubular, coal fired, 17 ft. 6 in. high × 7 ft. dia. × 160 lb. working pressure. Evaporation approx. 3,000 lb. per hour.

Cochrane No. 10 vertical multitubular, coal fired, 12 ft. 3 in. high × 5 ft. 6 in. dia. × 100 lb. working pressure. Evaporation approx. 1,620 lb. per hour.

Vertical Coal Fired, cross tube, 12 ft. × 6 ft. × 100 lb. working pressure.

Vertical Coal Fired, cross tube, 8 ft. 6 in. × 4 ft. × 100 lb. working pressure.

Vertical Coal Fired, cross tube, 8 ft. 5 in. × 4 ft. 6 in. × 120 lb. working pressure.

Vertical Coal Fired, cross tube, thimble tube, 8 ft. × 3 ft. 9 in. × 80 lb. working pressure.

Vertical Coal Fired, cross tube, 7 ft. 6 in. × 4 ft. × 100 lb. working pressure.

Cochrane, Vertical, coal or gas fired, hot water Boiler, 6 ft. × 3 ft.

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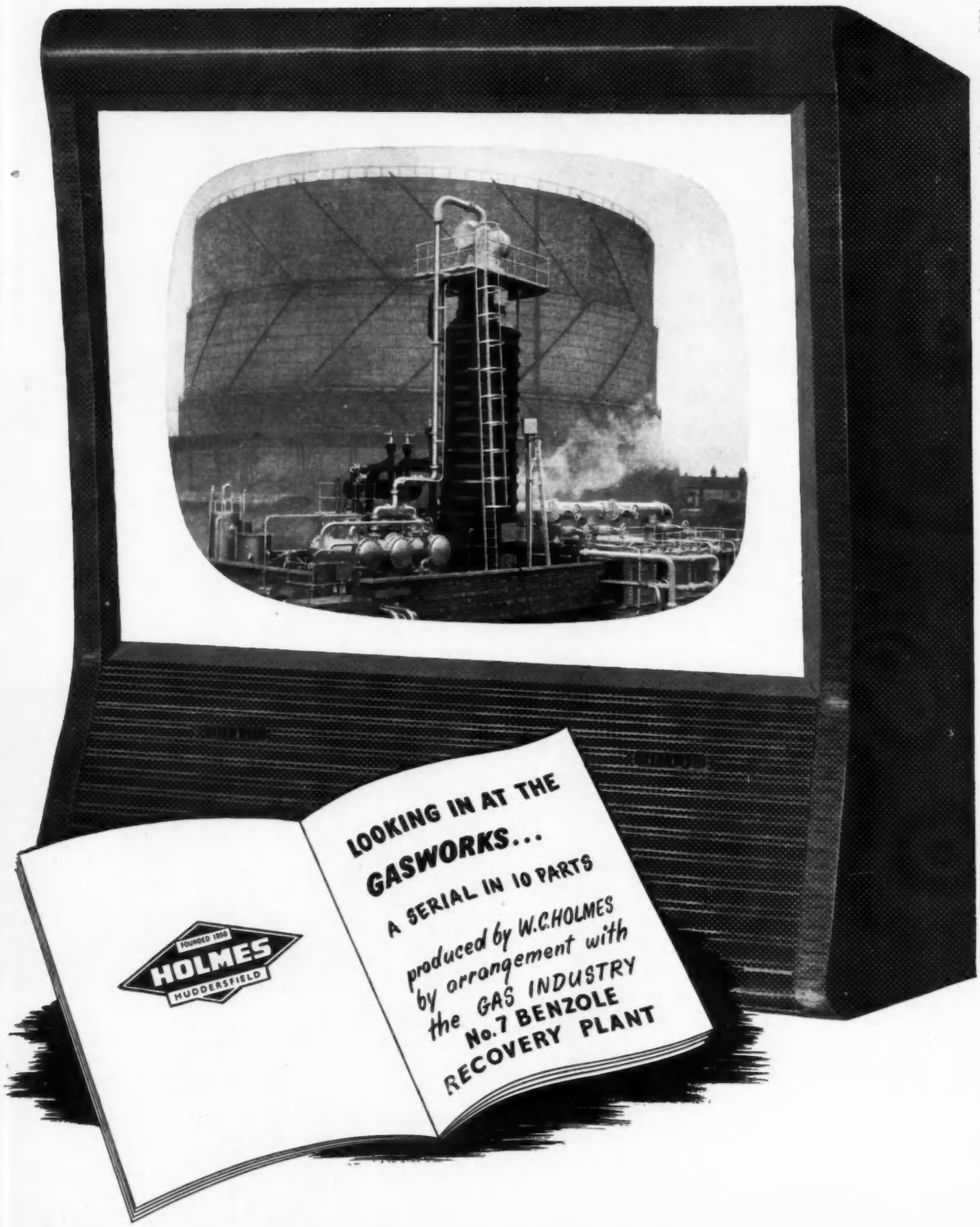
Commercial T.V. with no apologies



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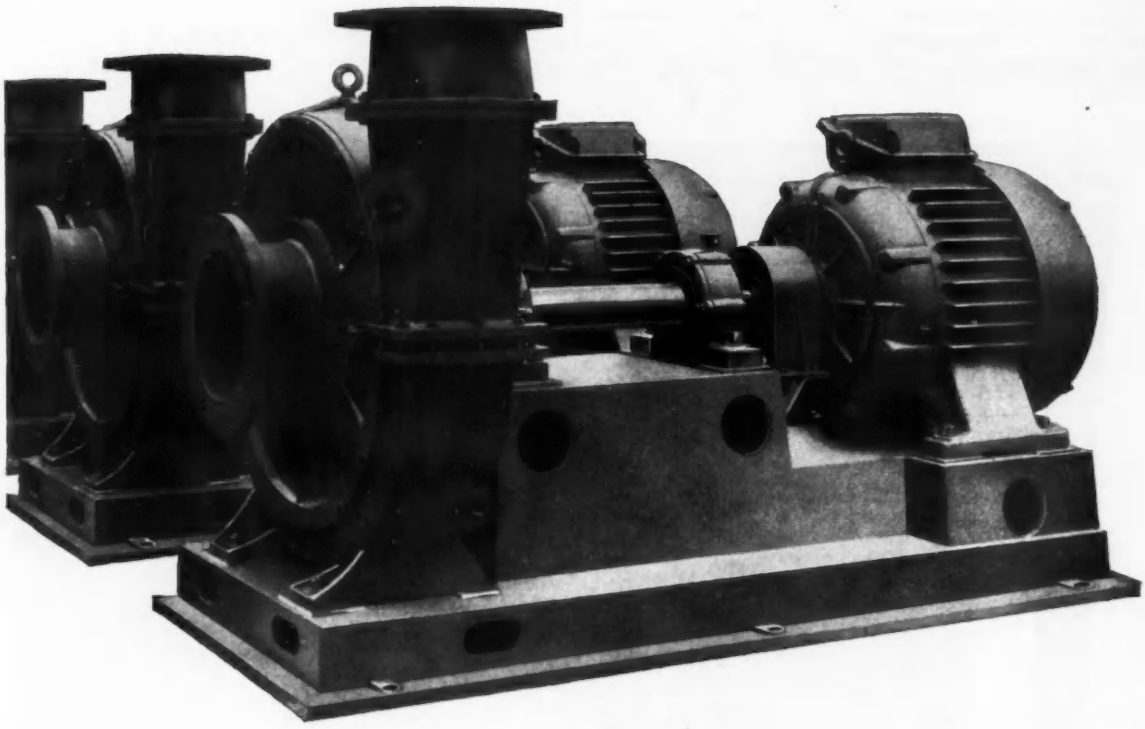
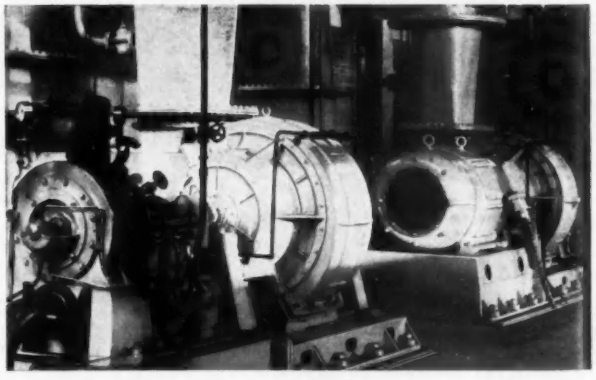


Gas Boosters?

Photo by courtesy of the S. E. Gas Board and Humphreys & Glasgow Ltd.



EXAMPLES of gas boosting fans with cast iron casings are illustrated here. They represent the results of special attention to the design and development of robust, trouble-free boosters over the years. This experience provides fans for handling volumes of 5,000 to 1½ million cubic feet of gas per hour at pressures up to several pounds per square inch.
When the time comes you'll find there's no easier way to solve your air or gas moving problem than to put it to Keith Blackman.

contact **Keith Blackman Ltd**
MILL MEAD ROAD · LONDON · N17 · TOTtenham 4522

T.A.7225/60

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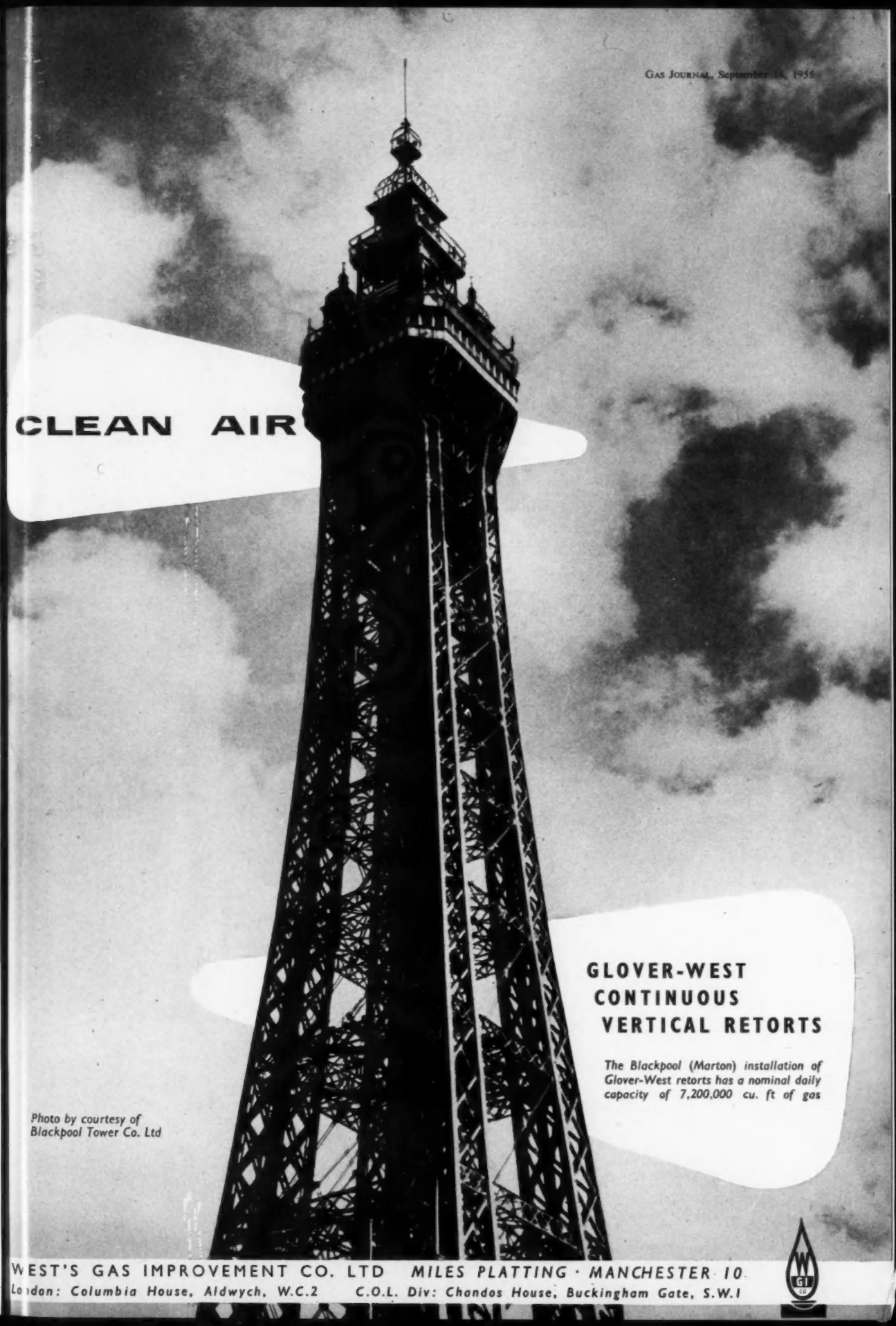


CLEAN AIR

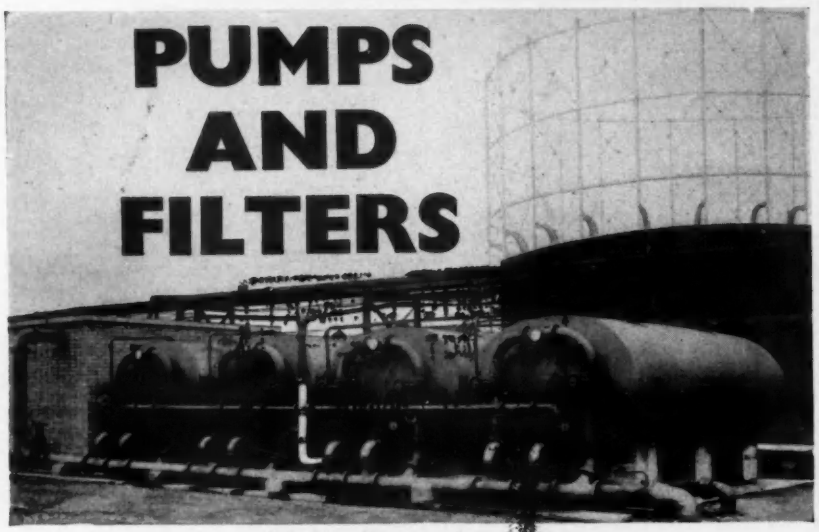
GLOVER-WEST
CONTINUOUS
VERTICAL RETORTS

The Blackpool (Marton) installation of Glover-West retorts has a nominal daily capacity of 7,200,000 cu. ft of gas

Photo by courtesy of Blackpool Tower Co. Ltd

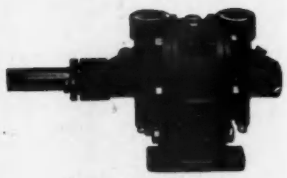
WEST'S GAS IMPROVEMENT CO. LTD MILES PLATTING · MANCHESTER 10
London: Columbia House, Aldwych, W.C.2 C.O.L. Div: Chandos House, Buckingham Gate, S.W.1

PUMPS AND FILTERS

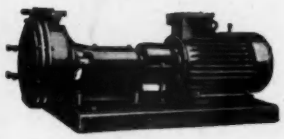


Filtration Plant in Gasworks

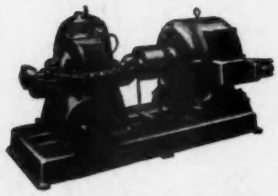
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



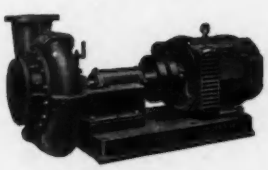
Rotary pump for Oil transfer duties



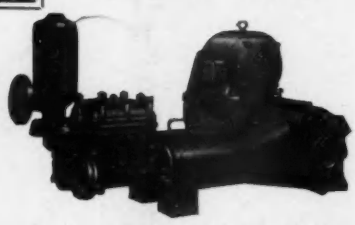
Stoneware pump for Corrosive and chemicals



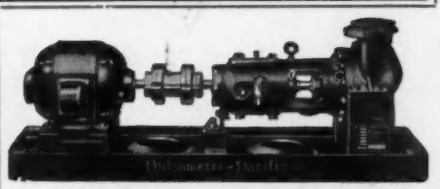
"HS" Type—for water services. All heads up to 500 feet.



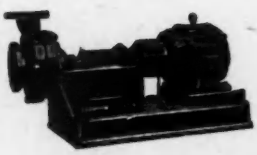
Slurry pump for coal washing and abrasive liquids.



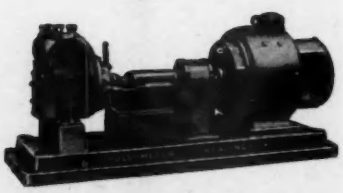
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

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